

WORLD EXCLUSIVE Associated's new pg. 26

Radio Control **CAR ACTION** T3 RACE TRUCK

47380

THE WORLD'S LEADING R/C CAR MAGAZINE

September 1997

Exotic Road Rocket!
Touring Car Hi-Tech
meets Classic Style

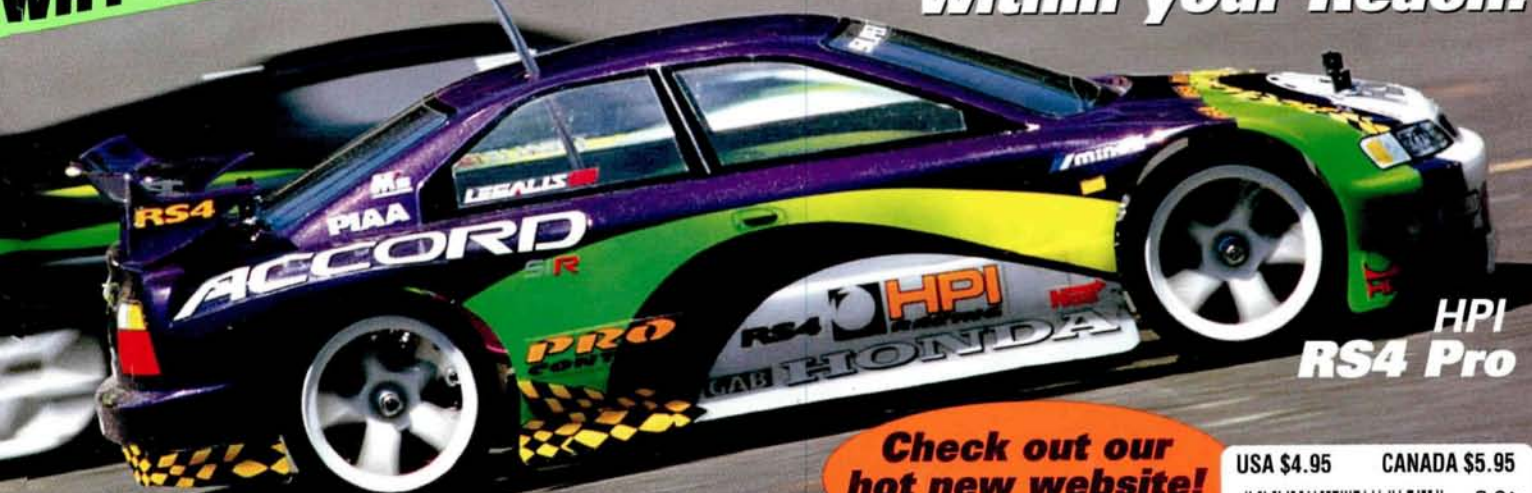


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Pure Ten



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Radio Control CAR ACTION

VOLUME 12, NUMBER 9 • SEPTEMBER 1997



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ON THE COVER (from top to bottom): Team Associated's brand-new T3 race truck (photo by Walter Sidas); Kyosho Pure Ten Cobra Daytona in action (photo by John Howell); 1/8-scale off-road buggies tear it up (photos by John Howell); HPI RS4 Pro at speed (photo by John Howell).

THIS PAGE (from top to bottom): Kyosho's Pure Ten GP Spider adorned with Cobra Daytona bodywork; HPI RS4 Pro; Thunder Tiger Mirage Vspec; nitro buggies on the move (all photos by John Howell).

EDITORIAL

New trends in the R/C hobby

can be challenging to predict. Consumers (that's you) drive the marketplace, and manufacturers have opportunities to lead by developing the right products at the right time, and all of us in the trade must keep our ears to the ground to understand the direction in which the market is going.

In the R/C hobby, there have been quite a few "bull's-eyes": the Tamiya Hornet and Blackfoot and the original Associated RC10 spring immediately to mind. Who would have predicted that touring cars would become so popular? Yet a great many hobbyists have become fascinated by these scale-looking, high-performance roadsters.

What's next is anyone's guess, but there are indications that *glow-powered* touring cars could be the new rage. This may be partly attributable to improvements in engine reliability and performance and ease of tuning (simpler carburetors, for example).

Additionally, the extended run time (great for enduro racing), realistic sound and smell of glow engines can be quite intoxicating to the racing enthusiast.

Kyosho can be credited with the creation of the glow-powered, narrow touring car. With its Pure Ten Spider 4WD, Kyosho pioneered the mating of a reliable, pull-start engine with a capable racing chassis, and Kyosho's Nostalgic Series combines the Pure Ten chassis with one of several vintage, '60s sports-car bodies.

We are excited by Kyosho's glow-powered touring cars and the World Cup racing series in which they compete. As promised in last month's issue in our coverage of the Kyosho World Cup finale in the Philippines, we have built and tested a "full option" version of the Pure Ten Spider (complete with a gorgeous Cobra Daytona Coupe body) similar to those raced at the finale. Gas touring cars are on the move, and with new models from such companies as HPI, FSR and OFNA, the competition will be hot.

■ An interesting phenomenon has appeared at a local off-road track. Since the opening race of the '97 outdoor season, there has been a large contingent of 1/8-scale gas buggy racers. This class has become so popular that it now boasts the largest number of entries at a track that once was predominantly electric.

We did some investigative reporting to identify the root of this class's popularity and found that a new breed of afford-

able—and competitive—gas buggies is responsible for getting quite a number of racers to belly up to the nitro bar. One such buggy is the new Thunder Tiger Mirage Vspec, which author Greg Vogel reviews in this issue. Combining quite "raceable" performance with improved reliability and low cost, cars like the Mirage may very well signal the growth of what once was an "Only the most serious need apply" form of racing.



Visit the *Car Action*
website at
<http://www.airage.com>

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Radio Control CAR ACTION

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Looking for Yankee

After reading the review of the Yankee Dodge 1/4-scale Viper (July '97 issue), I tried to contact CEC at the phone number printed in the Index of Manufacturers, but it must be incorrect because I couldn't get through. What's the deal?
THOMAS HERMANN
via email

Yes, we printed an out-of-date phone number for CEC. Chris Fine of CEC has temporarily had that number reinstalled, so you could try it again or dial (914) 342-8697. We apologize for the inconvenience.

ESP vs. Bennet

You have a killer mag. I've been reading it for about five years and have been a subscriber for two. In the July '97 issue, I saw "Project Big Truck, Part 3," and right away, I knew that was for me because I'm a 4x4 lover. Is the Bennet Clod-A-Leaver chassis comparable in performance and construction to the ESP chassis? Does ESP offer a complete rolling chassis kit? I ask because I don't own a Clod Buster. What would be a good turn and wind motor to use? What would be a good ESC, and should I use one or two? Is the Aveox combo a better bet, and is it comparable in price? Where can I get it? I know I'm asking a lot, but I would appreciate it if you could answer these questions.

KYLE DEAN
Gridley, CA

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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John Howell: johnh@airage.com
Chris Chianelli: chrisc@airage.com
George Gonzalez: georgeg@airage.com
Cindy White: cindyw@airage.com

Hang tight, Kyle; we've received a ton of letters and email regarding a shootout between the two titans, so in a future issue, we plan to pit the two trucks against each other to see which reigns.

To answer your other questions: both companies offer chassis kits; you'll have to supply the gearboxes and a few other assorted items as well. You could call both manufacturers and explain your situation; maybe they'll be able to point you in the right direction.

Use a motor that has more torque than rpm. Stick to something in the low-turn (11 or 12 turns), single range. The Aveox motors, though more expensive than typical 540 motors, provide more power and also come packaged with their own speed control. It's an option that you might want to look into. You can contact Aveox at (818) 597-8915.

Why Don't the Pros Use 'em?

Looking through my most recent issue of *R/C Car Action* (July '97), I came across the Associated RC10B2 Sport ad. Something I was aware of but had never really thought about dawned on me. Almost all sport versions of off-road vehicles have three-piece, screw-together rims, and all team versions have one-piece rims. This seems backwards to me. Most pro racers usually have a ton of different kinds of tires, and backyard bashers usually use only a couple of different types in addition to the stock ones. I once saw a guy at my local track who had 10 different treads. Ten! That's a lot. My point is that pro racers would be a lot better off with screw-together rims than having to buy rims to suit every type of tire they use. But they just buy more wheels for their tires. Isn't this a total waste of

money? Why do they do it?

In response to the guy who asked about the nitro MRC Baja King (same issue): in their 1996 Silver Anniversary catalogue, Tower Hobbies offered an MRC nitro Thunder King, but it isn't in their 1997 catalogue. What happened to it? The two trucks have the same chassis, so can you guys confirm that it was here, or that it's coming? ... or something!
CHRIS ROGERS
Lincoln, CA

Chris, top pros and serious club-level racers are always looking for ways to go faster, and there's one good reason to use one-piece wheels: they're lighter. Lighter wheels mean quicker acceleration, and they allow the suspension to react more quickly. Think of it this way: let's say you try to swing a concrete block on a rope around in a circle in front of you (like an airplane propeller turns); it would take an awful lot of energy to swing that sucker around and get it going, wouldn't it? Now, let's tie a small brick to that rope and do the same thing. It will take less effort and energy to get it moving and keep it moving, won't it? The same principle is in effect with the three-piece wheels and the one-piece wheels. Obviously, it is more expensive over time, but if you're looking to get an edge in performance, this is one of the areas where you have to lighten the load. Good thinking, though!

To answer your other question: we've heard that a nitro Thunder King is on its way from MRC. We'll tell you as soon as we hear more.

Singing the Servo Blues

I read your magazine every month and always find it

enjoyable and informative. I recently bought a Hitec HS605MG BB servo for my Losi Double-XT. I was somewhat disappointed to find that the Losi servo arms do not match the output shaft on the servo. As you probably know, the Double-X steering setup requires a rather specially shaped servo arm. In the June issue of *Car Action*, you reviewed the HPI Nitro RS4. I noticed that you used a Hitec servo in the RS4 and that the steering arm looked like something that would work in a Double-X. Could you give me any information on that? Thank you.

JOSH LERNER
via *R/C Car Action* online

Josh, you are indeed very perceptive; commendations on your thoroughness. Yes, we did use a Hitec 605BB servo for steering and a 525BB for the throttle. We used the Futaba servo horn that came with the Nitro RS4 kit. This servo horn was not intended for a Hitec servo, but it does work with it. Hitec and Futaba servos have the same spline diameter, but their gear mesh differs. Basically, the Futaba servo horn was forced onto the Hitec servo, and the machined screw that secures the servo horn to the servo was really torqued down. Believe it or not, it works great, and we've never had any problems.

Unfortunately, there is no way to fit the Hitec 605BB servo in the space provided on the Double-XT; it's just too big. So, finding a perfect servo horn will not solve your problem. You'll have to pick up a different servo. The Hitec 545BB will fit inside the Double-XT, but you'll have to address the servo-horn problem once again. Your best bet is to pick up one of the servos that Losi recommend in their instruction booklet. ■

In search of fun
and glory, 'cause
life's too short
to be a sheep • by Chris Chianelli

INSIDE scoop



**LATE-
BREAKING
NEWS
FLASH!!**



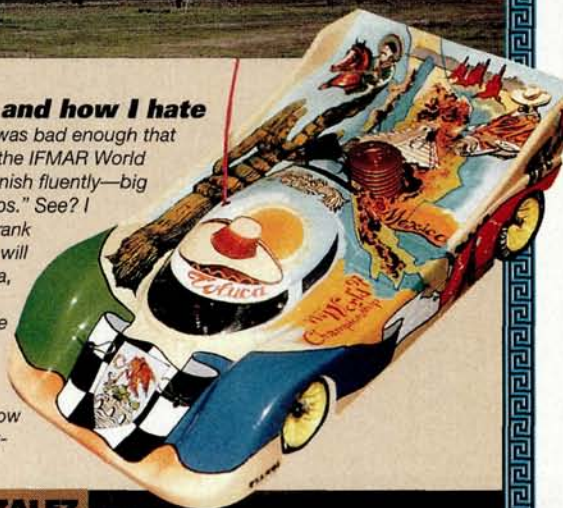
Attention drivers!
Car Action has
revamped its web-
site—I mean from
top to bottom,
R/C car fans! Wait
till you see. Be
the first to get the
scoop on the
latest products
and events and
talk to the editors.
It's ready to go
and awesome. At
the site, you'll
find: Hot News,
Race Results,
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Viva El Nitro! ... and how I hate George because he got to go!

OK; it was bad enough that George Gonzalez went to historic Mexico City to cover the IFMAR World Championships and I didn't (OK, so he does speak Spanish fluently—big deal! Watch this: "Buenos dias", "gracias," "adios amigos." See? I know enough to get by). Then, adding insult to injury, Frank Masi (our Grand High Mystic Ruler) tells me "Chris, this will make a great lead-off 'Scoop,' don't you think?!" Oh yea, right ... sure Frank. Just say anything and I'll agree. It's OK Frank; I didn't want to see the fastest R/C cars in the world ... or ancient pyramids ... or beautiful Aztec princesses!

I hate everybody this month—except, of course, my wonder girl-dog Luna. OK, that's all I have to say—I'll now turn this first "Scoop"—and this one only—over to backstabber ... I mean ... George.



GONZALEZ ON THE GO IN MEXICO

"Pinch me. I must be dreaming." [CC: no George; you're in the woods retrieving your out-of-control car—again!]



Mr. George "I got to go and Chris didn't!" Gonzalez was there, too.] Some of them are professional factory drivers for Serpent, BMT, Mugen, Picco and several others, and these world-class racers battled it out for the chance to earn the prestigious title of world champion. Defending four-time world champ and Team Serpent driver

Those were my initial thoughts when I arrived at Club R.C. Pegaso in Taluca, Mexico, site of the Eleventh IFMAR 1/8-scale On-Road World Championships, which many consider to be the Formula 1 of R/C car racing. If there's an R/C Disneyland, this place is it!

[CC: I heard George wore a Goofy costume at the race.]

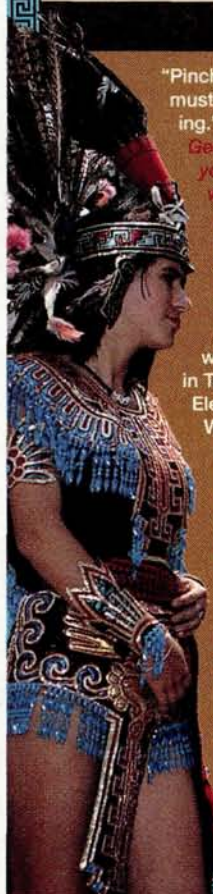
Arguably the finest R/C facility in the world, Club Pegaso has undoubtedly set new standards of professionalism, and this will serve as a benchmark for all future world championships whether on-road or off-road, electric or gas.

Along for this spectacular event were 143 of the world's finest 1/8-scale on-road racers representing 20 countries. [CC: Yea,

ver Lamberto Collari (Italy) hoped to extend his winning spree, but during the qualifiers, it became clear that the competition was immense. Michael Salven (Germany) and Fabio Domanin (Italy) posted amazing 37-lap runs—one more lap than Collari.

At the start of the 60-minute grand final, Michael Salven took the lead while Collari and Alberto Picco battled for second. Ten minutes into the race, a chain of events led to an amazing ... sorry; you'll have to wait for the next issue to find out what happened. [CC: see! see how George let I bet you hate George now, too!] Be sure not to miss the next issue of R/C Car Action, or you'll miss out on a piece of R/C history. [CC: this would be an incredible piece of RC history: "FLASH! George Gonzalez' over-powered car misses the spectators and stays on the track for a change!"]

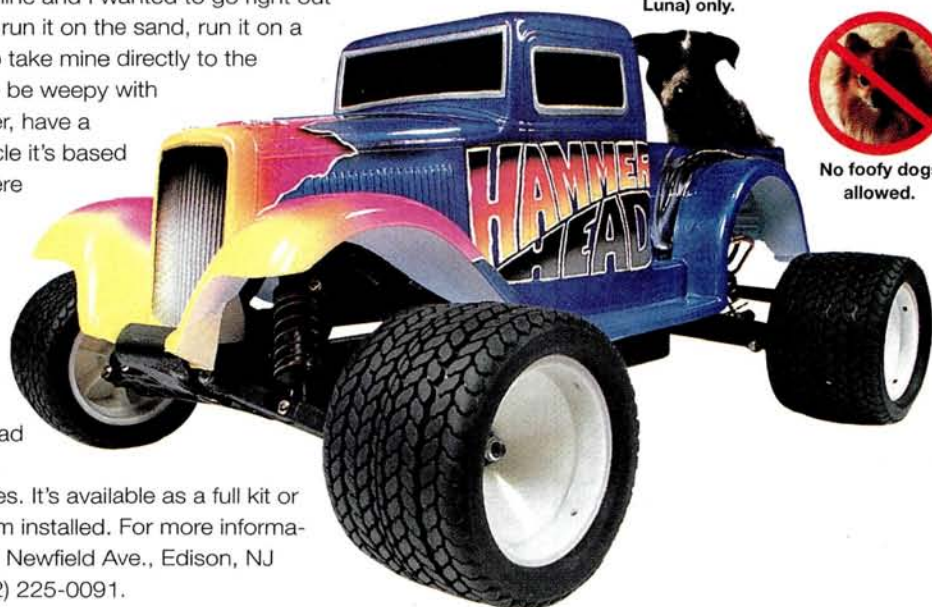
Contributing author Mike Myers and I were in Mexico for the entire two weeks and managed to bring back all the flavor and excitement of this incredible event. —GMG
(It's me and Luna against the world!)



INSIDE **scoop**

Hammerhead = *serious fun*

One look at this '30s fun machine and I wanted to go right out and run it. Run it on the dirt, run it on the sand, run it on a craggy back lot. I'm going to take mine directly to the Wasteland! The Humongous is sure to be weepy with envy. The Hammerhead does, however, have a serious side that comes from the vehicle it's based on—MRC's MT-10S stadium truck. Here are just a few of the features it has inherited: non-flex, heavy-duty resin chassis and wide-track suspension arms; oil-filled coil-over shocks with two sets of pistons for damping options; adjustable shock towers and ball differential. For added speed and all-terrain applications, the Hammerhead also adds a high-performance 20-turn motor and high-traction, low-profile tires. It's available as a full kit or ready to run with a Futaba radio system installed. For more information, contact Model Rectifier Corp., 80 Newfield Ave., Edison, NJ 08837-3817; (732) 225-2100; fax (732) 225-0091.



Cool dogs (like Luna) only.

**Hammerhead
"Riding-Dog"
regulations:**



No foofy dogs allowed.

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25,600 RPM, No. 9201



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Monster Trucks, Planes, Boats
17 Turns, 1 Wind
24,150 RPM, No. 9202



-DIAMOND-

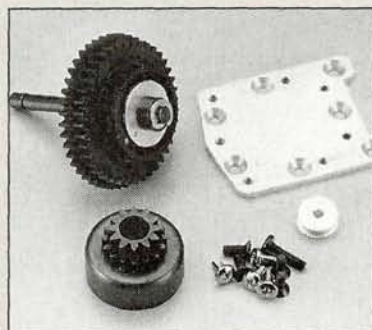
1:10 On-Road/Oval
12 Turns, 2 Winds
33,750 RPM, No. 9203



New **Dynamics**

Bolink's '97 Chevy Supertruck features improved aerodynamics (because of its new, higher-downforce nose) and decreased drag (with its narrower, lower roof). It includes decals and a rear spoiler. Contact Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0252; fax (770) 963-7334.

2-speed tranny Beetles & Rams



The new Kyosho Quick Reverse Clutch (QRC) 2-speed transmission will boost both the off-the-line acceleration and the top speeds of Kyosho's Dodge Ram and Baja Beetle. By adding a second forward gear, this recently introduced option makes the power of the engine in these vehicles much more usable. Six gear ratios are offered, so the new tranny can be made to meet any off-road conditions. For more information, contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.



Rare Examples Of Performance And Economy.



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27,060 RPM, No. 9206



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INSIDE scoop



Associated's **T3** OVER TWO YEARS IN THE MAKING

You're looking at the first ever pictures of the T3—Team Associated's latest weapon in the racing truck wars. Until now, no one outside of a few key personnel at Associated has been allowed to view the T3. As you can see, the T3 closely resembles the world champion B2 buggy. In fact, sources at Associated tell us that much of the design work for the T3 was done two years ago, when the B2 was being developed for the '95 worlds. T3 features include a longer, molded chassis; improved steering geometry for optimum wheel/servo travel ratio; a rigid, molded rear shock tower; longer rear shock bodies for more extension; and a new Ford F-150 racing truck body. We'll show more of the T3 in the October issue of *Car Action*, so don't miss it!

Thought you guys would love a look at the latest FG Modelsport 1/5-scale machine from S.E.I. Racing. Beautiful, isn't it? Powered by the new 2.2hp Zenoah '97 22.5cc gasoline engine, the McLaren is reported to hit speeds of nearly 50mph.

1/5-scale **McLaren F1 GTR**

The German-built car incorporates technology found on other FG cars, plus lightweight alloy turnbuckles throughout. FG accessories, such as ventilated disc brakes, Eibach racing springs and electronic traction control can be fitted to the McLaren. We will have an in-depth report on this car in the near future.

Meanwhile, for more information contact S.E.I. Racing, 14836 N.E. 31st. Cir., Redmond, WA 98052; (425) 556-9090; fax (425) 556-9292.



Pocket Programmer

Novak's Pit Wizard is a hand-held microcomputer-based tool that allows you to adjust parameters on the Novak Cyclone ESC without the need for a PC or laptop computer. For those who don't know, the Cyclone has programmable functions that can be accessed and adjusted using the Pit Wizard. These functions are: neutral position, full throttle; full brake; deadband; minimum drive; drive PWM frequency; brake PWM frequency; drag-brake value; drag toggle; and drag-brake frequency.

Having been created, the new racing profile can be downloaded to the Cyclone and/or stored in one of Pit Wizard's 10 memory locations. Think about it. This means you can experiment and formulate ESC parameters that really work for you on the short hairpin-ridden track you race at on Fridays; then you can formulate a totally different set of parameters for Saturday's high-speed track with long straights and lots of sweepers. You simply save specific parameters for the various tracks you frequent, download the appropriate set for the track you plan to race at on that day, and your ESC is race-ready, tuned and tweaked for you—instantly! Now, I think that's cool. For more info, contact Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92612; (714) 833-8873; (714) 833-1631.

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1997. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

RACING WITH THE MOON

Because Scott Miller of Pasadena, CA, loves running his well-equipped Losi racetruck in the sand at Glamis, he has had to design tires that won't toss the sand back into the chassis. He also added Red springs in back and Pink in front, Trinity Purple screws and Lunsford turnbuckles to his stylish ride. He controls the truck with a Novak Tempest Pro speed control and powers it with a Reedy DS modified motor and Zip battery packs. Scott has added custom taillights and headlights as well as a buggy whip antenna light.



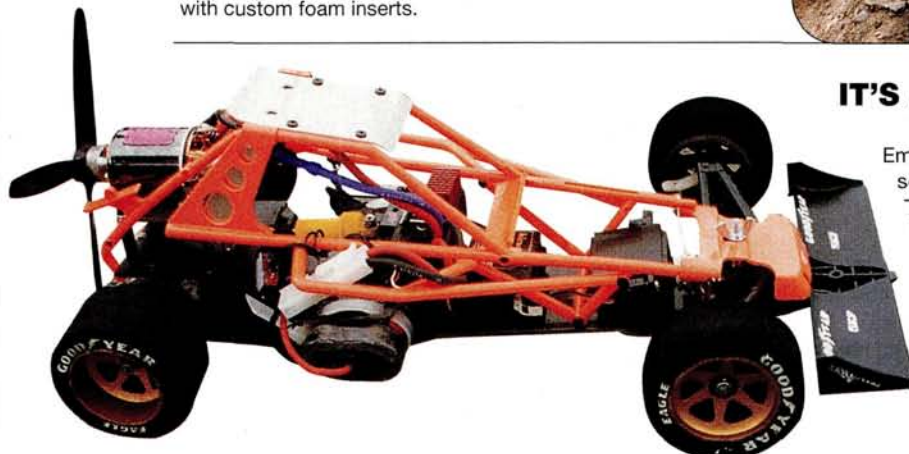
"REMOTE" CONTROL BUGGY

In their remote community of Seiad Valley, CA (two hours from the nearest ice cream cone and movie theater), Fred Nelson and his two-year-old son keep busy fishing, rafting, racing their OFNA Worlds GT and, most recently, rebuilding their R/C track—severely damaged in a January '97 flood. Fred has equipped their Ultra GT with an RB Concept 5 engine with Turbo port, two Airtronics 94158 servos, CVD drive axles and an Airtronics CS2P FM radio system. He topped off the car with this airbrushed Jammin' body.



PROJECT TRUCK USA

Christian Danner of Xanten, Germany, sent us this photo of the 15-pound Project Truck USA that he has spent hours modifying and detailing. A replacement 2.5-inch stretch-aluminum chassis and a custom-built suspension system are just two of the many mods that give our own PBT3 (see the July '97 R/C Car Action) a run for its money! It uses two Hitec HS 605 servos, a Sanyo 4400mAh 8-cell custom pack and a 5-cell, 1200mAh NiMH receiver pack. It's controlled by a Tekin 610R speed control with cooling fan and a Futaba Field Force 3UPC PCM radio. Christian finished the ride with Pro-Line Giant Track tires with custom foam inserts.



IT'S A BIRD, IT'S A PLANE, IT'S A CAR!

Emmanuel Beaufils of Yvré Levêque, France sent us this photo of his project car, a Tamiya F1 with Kyosho off-road body. The "Thing" reaches 30mph with a Graupner prop and Trinity 11-turn double motor. Emmanuel admits that the only problem he has is that he can't get a brake to work with his car. This has its advantages, though; competitors aren't tempted to follow him too closely, and he leaves a clean track in his wake!

PERFORMING PANDEMONIUM

Kris Jokelainen of Thunder Bay, Ontario, Canada, sent us this picture of his converted Associated RC10. He added "tons of parts" as well as mostly graphite pieces to the original "dune buggy" and took fifth overall and the "Rookie of the Year" plaque at his club races last season. He has equipped it with a Novak Duster Sport ESC, Trinity Midnight motor, Futaba radio gear and Trinity batteries. He topped off this concours-winning ride with a Pactra paint job that he completed himself.



ONE HOT HONDA

Johnny Ha of San Diego, CA, tells us he's a lot quicker off the line with his HPI RS4 Pro Accord now that he has equipped it with an HPI 2-speed tranny. The Accord runs off a Novak Polaris AM receiver, Novak Tempest Pro ESC and Dirtinator modified motors. It's controlled by Airtronics Rival RV2P radio gear. He has upgraded the suspension with Tamiya Red and Blue springs along with 30WT shock oil and swaybars. For great looks, Johnny customized a mid-wing spoiler, rearview mirror, side markers, windshield wiper and working LED fog lights. It rolls over the finish line on HPI super-slick, low-profile tires.



SLEDGEHAMMER

Blake Baker of Canton, TX, got this Traxxas monster about three months ago, and he hasn't stopped improving it. He has added this HPI Dodge racing body, HPI racing rims, Novak Duster II speed control, Kinwald Dirtinator 12-turn modified motor and new tires. Blake's friend bet him \$20 that the new mod truck wouldn't be able to take the old truck body lying in its path. It rolled over it with ease, and Blake won.

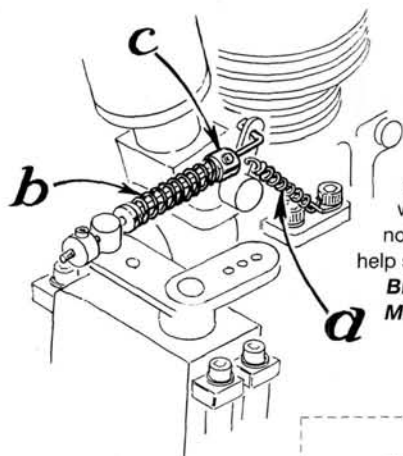


DANNY BOY'S FIRE WAGON

Modified from a Tamiya King Hauler, Dan O'Neill of Souderton, PA, added a scratch-built pumper tank to make this great-looking fire engine. With running lights, brake lights, turn signals and four sets of operational flashing lights, as well as sound effects for a motor, horn, back-up alarm and three siren sounds, this wagon is ready to respond to any fire.



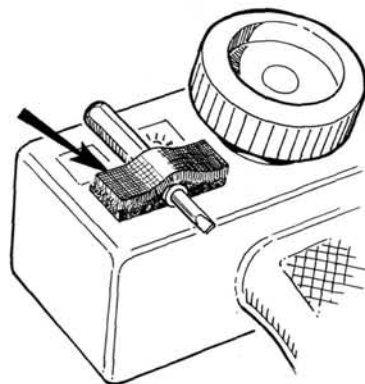
NOVAK
ELECTRONICS, INC. RACING TEAM



Open and Shut Case

Replace a lost throttle spring (a) on your Losi GTX with a compression spring (b) between the throttle arm and a wheel collar (c). The stand-in setup will not interfere with braking action and might help save your engine if the radio signal is lost.

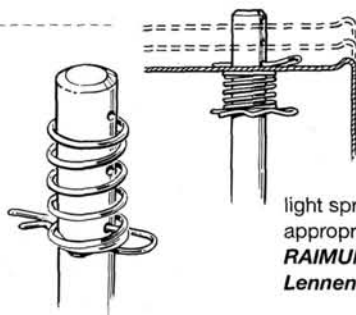
BILL HAWK,
Midwest City, OK



A Stick-Up

Use a Velcro®-brand fastener to attach a screwdriver to the side of your transmitter for on-the-spot tune-ups.

MARK LOIZOU,
Yonkers, NY



Bouncing Body Mounts

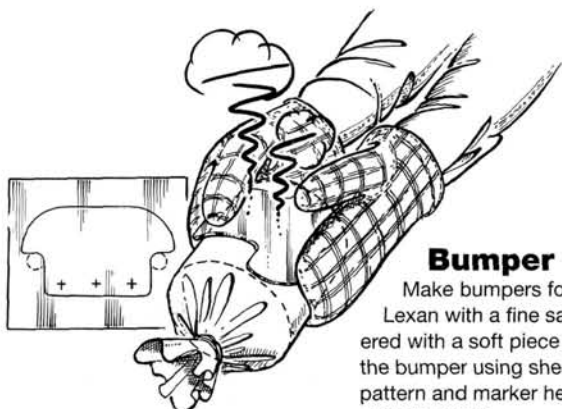
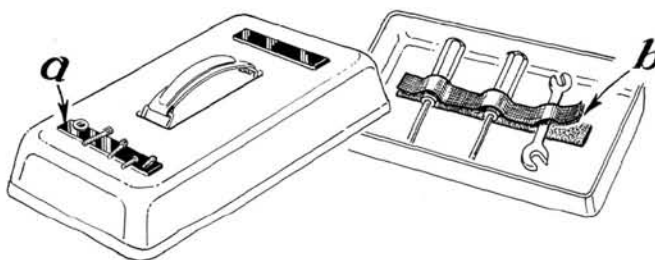
To easily mount different bodies on one chassis without having to switch body posts, attach light springs to the posts and place the body clips in the appropriate-height holes.

RAIMUND SCHMIDT,
Lennenstadt, Germany

Attractive Solutions

Glue a magnetic strip to the lid of your toolbox to store small screws and washers. You can also glue a strip of Velcro®-brand fastener inside the lid to make small, frequently used tools readily available.

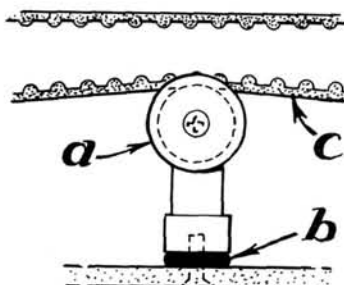
CLINT HALLER,
Airdrie, Alberta, Canada



Bumper Crop

Make bumpers for your ride in one of the following ways: cut the bumper from 1/8-inch (3mm) Lexan with a fine saw, heat in a 300-degree oven (145-degrees C) and wrap around a can covered with a soft piece of cotton (a T-shirt works well) to cool. Or, heat the Lexan first and then trim the bumper using shears; drill 3/16-inch (5mm) holes at the inside corners to prevent cracking. A pattern and marker help in laying out the shape.

DONALD NIX,
St. Charles, IL



YR-4 Belt Tension

Tighten the belt on your Yokomo YR4 by raising the belt-tension assembly and putting an O-ring or washer beneath it.

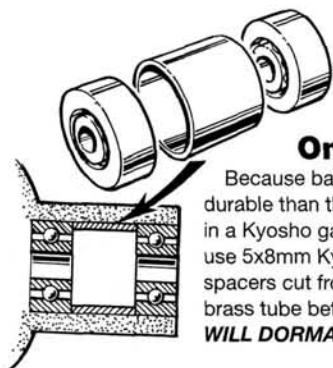
JASON MAK,
Coquitlam, BC, Canada

(Continued on page 39)



PIT TIPS

(Continued from page 34)



On the Ball

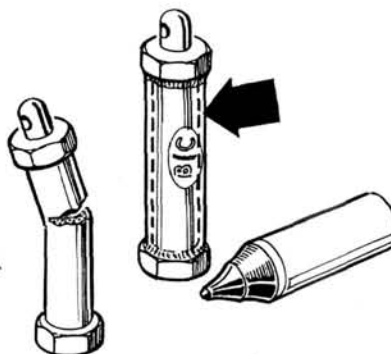
Because ball bearings are more durable than the needle bearings in a Kyosho gas car's clutch bell, use 5x8mm Kyosho bearings with spacers cut from a $\frac{5}{16}$ -inch (8mm) brass tube between them.

WILL DORMANN, Meadville, PA

Flick Your Bic®

Do you have a broken body post? Cut a short plastic sleeve from a Bic® Round Stic pen and use CA around the broken parts. This makes the post stiffer and more durable than it was originally.

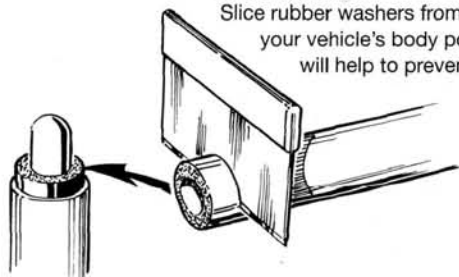
JAMES HARPER, Battle Ground, WA



Cushy Job

Slice rubber washers from $\frac{5}{32}$ -inch (4mm) automotive vacuum hose and slide them onto your vehicle's body posts. The washers make a softer cushion for the body shell and will help to prevent the cracks and scratches caused by vibration. For a slick cut, lubricate your cutting tool's blade with liquid detergent.

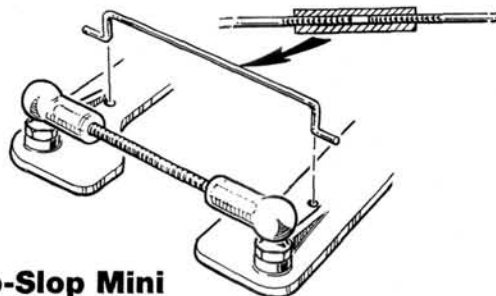
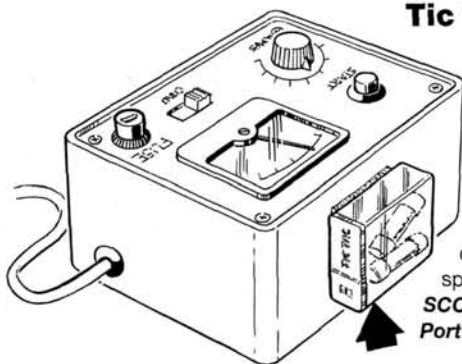
THANG TRINH, Garden Grove, CA



Tic Tac Fuse

Older chargers may blow a fuse if you overload them; use adhesive servo tape to mount a Tic Tac™ plastic container on one side of the charger to hold spare fuses.

SCOTT ZINGER, Port Jefferson, NY



No-Slop Mini

Eliminate steering play from your Tamiya M-chassis car by removing the Z-bend wire and replacing it with ball joints and a threaded rod, as shown. Drill two holes of the same diameter as the Z-bend wire, using the stiffening ribs as a guide; then, insert the Z-bend into those holes. You could also make an adjustable rod by using two threaded rods from a model airplane; twist them into a piece of thick-wall nylon tubing (arrow).

KIT NAVIA, Quezon City, Philippines

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



Modified Motor Rehabilitation

THE RECENT interest in modified-class sedan racing, combined with the advent of Sanyo's new, ultra-long run time RC-2000 Ni-Cd cells means a lot of older, modified motors are once again seeing the light of day. Originally purchased for off-road or truck racing then abandoned when run times and mondo battery prices became an issue, these low-turn modifieds of years past really shine when they're strapped into a Yokomo YR4 or Tamiya TA03. I recently came across a long-forgotten, 11-turn, triple-wind modified motor that was based on an Epic can. Although in generally good condition, it was pretty tuckered out (see chart). Hoping to come up with an alternative to the 12-turn-triple I usually run in my 4WD speedster, I figured I would attempt to resuscitate it.

Mark the timing on the can and endbell with a scribe or sharp blade so you'll know where everything goes when you've finished.



Read along as I explain how to take a tired old mod like this one and juice it up enough to put you back into the winners' circle.

CLEAN AND MARK

I began by cleaning the can's exterior and the endbell. From the look of the dirt and dust still clinging to the brush hoods, the last time I ran this motor was in the dirt, most probably in my Team Losi Double-Xt. Off-road truck racing involves some of the worst conditions in R/C: high revs, heavy wheels and tires, lots of ram-bunctious jumps and rough, shoulder-to-shoulder racing action. That meant I would have to totally rebuild the motor, because it was likely that dirt from my off-road escapades had worked its way well inside and was grinding away at the comm and brush faces, invading the interior of the shaft bearings and making the motor run so hot that the springs had probably weakened to the point at which they were virtually useless.

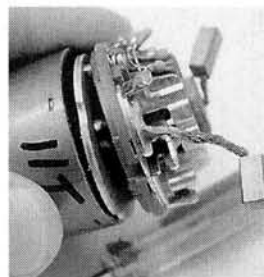
After using a stiff brush on the exterior and scrubbing the endbell with an old toothbrush, I used a sharp awl to mark the

endbell's location. In the past, I used a permanent marker to indicate the timing, and then I discovered that many motor-cleaning sprays washed the marks off along with the dirt. I'd much rather have a permanent scratch in my motor's can than try to figure out optimum timing all over again! If you ever do have to determine proper timing, start at zero degrees (with the endbell positioned so the brushes are centered over the magnets), and advance 1 degree at a time on the dyno until you get the performance you're looking for.

DISASSEMBLE AND NOTATE

After I'd removed most of the gunk from the exterior, it was time to open the can and take a look at the real ugliness awaiting me. First, I removed the brush springs and pulled the brushes from their hoods. A quick peek at the brush faces confirmed my initial diagnosis: this was going to be a total redo. The faces were very dark, with a black, smeary coating that looked suspiciously like old comm drops combined with soft brush material. Yep; that's the way I used to run my off-road power-mongers; those older, super-soft brushes supplied incredible bottom-end torque that allowed me to pop the truck over doubles with a short blip of the throttle. Ah, the things we'll do to get horsepower

Next, I loosened the two screws on either side of the endbell and rotated it about 20 degrees, until it lifted free of the can. Turning the endbell over carefully, I dislodged the two small washers that were held against the



Remove the brushes and springs, loosen the endbell screws, rotate the bell and open the can.



Uck! Talk about nasty! Even though there's brush dust everywhere, the motor was put away dry, so there's no sign of rust or oxidation.

upper bearing. Although I saw no signs of rust or oxidation, an incredible amount of black, graphite-laden brush dust covered every surface. Uck! I noticed another thin washer still sitting on the upper shaft, so I removed it carefully and laid it on the bench with

DYNO READINGS

BEFORE REHAB

AFTER REHAB

25 amps	488/36200	528/29500
30 amps	512/22100	544/26600
35 amps	532/20800	604/23900

Count the number of washers on each end of the shaft and write the number down for future reference. If necessary, add more spacers when you reassemble the motor.

obtained a diamond-tipped bit since I tested the unit last year; it produces a much smoother finished product than the original carbide bit. (After I saw that the carbide unit was producing a satin finish more than a shiny one, I knew it was time for an upgrade.) With just a few thin spacer washers in place and an application of comm drops to lubricate and ease the cutting, I made the first light pass to determine how much material would have to be removed to make the comm totally round and even. After making the initial left-to-right cut, I saw that there were still some dark, shallow depressions in the areas around the pole slots. That's pretty common in

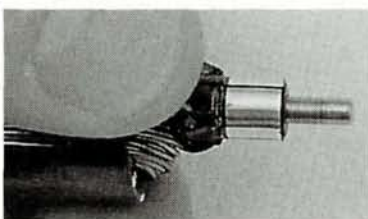
notes, I found that the motor had indeed been equipped with some pretty stout brush springs. One more pass, and the entire commutator looked shiny and new and ready to kick some serious asphalt butt. I dragged a hobby knife's blade backwards through the pole slots to remove any copper dust within, and I lightly burnished the slot edges with a ballpoint pen that I keep in my toolbox for that purpose.

With my well-used Ungar* Race Station at full boil, I unsoldered the old brushes from the endbell. Using the magnifying glass, I could see they had just a slight bluish tinge at the business end—again typical of a hard-working off-road motor. Since I saw

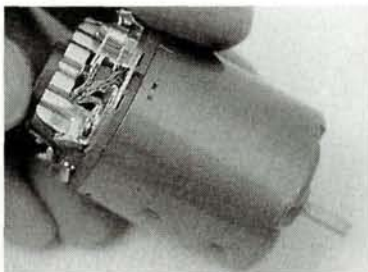
no signs of the burning or charring that indicate an overheated armature, I wasn't too worried that the arm had been fried on its last outing. To keep the fumes out of the house, I headed outside to the motor pit, a special dirt-only area far from the shrubs and trees so I don't have to worry about overspray damaging the leaves. The can, armature and endbell all got a thorough flushing with Paragon's* Formula One motor cleaner. I've found it extremely friendly to armature epoxy, yet it does an admirable job of removing every last trace of oil and grime. With all the dirt banished to the pit, I headed back to

my secret underground laboratory to reassemble and tune all the component parts.

(Continued on page 191)



Just a few light cuts on the comm lathe restored the comm to like-new condition. Most full-service hobby shops and racetracks offer this service to their customers for just a few dollars.



Reassembled, dyno'd and ready for action, this motor has a new lease on life in the pavement wars!

hard-run modifieds that use heavy spring tensions, no matter what kind of brush compound you use; checking my disassembly

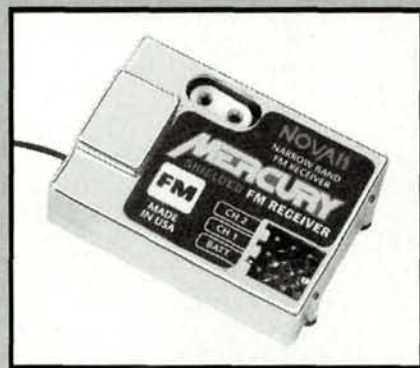
its brothers. After I noted in my bench log that there were a total of three washers on the upper end, I pulled the armature straight out of the can interior, and that loosed another volley of brush dust and accumulated dreck from the motor's lower end. Peeking into the can, I saw that yet more black dust covered the magnets and can interior, although a single shiny washer peeked at me from the lower bearing. Did this thing really get that dirty during a single day of racing? I carefully poked a moistened fingertip into the bottom end and snagged the errant washer before it could stick to one of the magnets, and I noted in the log that there had been only a single lower-end spacer.

SLICIN' AND DICIN'

As I expected, the comm face was a total mess: dark, smeared and coated with the remains of a sticky substance that I assumed was a combination of fine dust and comm drops from its last performance. I gave it a quick shot of motor spray to remove the most offensive junk and wiped it with a soft cotton rag. Using a magnifying glass, I could see that things weren't as bad as I'd thought. Although it was filthy, the comm's face was free of deep gouges and scratches, and my calipers told me it was still large enough to take a couple of cuts on the lathe.

Pulling out my Trinity* Modified Armature Comm Lathe, I set up the comm for a slice or two. I'd

TEAM SECRETS



Just Another Pretty Case?

Although the Novak Mercury Shielded FM Receiver looks great, the chrome case actually serves a unique purpose.

The Novak **Mercury Shielded FM Receiver** is truly a sight to behold.

A micro-receiver for R/C surface models, the Mercury operates on a narrow band that is not affected by signals 10 kHz away! With dimension of 1.10 x 1.54 x 0.47 inches and 0.65 ounces, the Mercury is easily one of the **smallest and lightest receivers** on the market.

The Mercury's superior Adjacent Channel Rejection allows for usability with all the odd and even channels on 75 and 27 MHz frequencies. **Low voltage operation** (down to 3.0 volts DC) and **Solid State RVP™** (Reverse Voltage Protection) makes this star tough.

Shield Yourself!

The Mercury is the R/C car industry's first Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) protected receiver, made possible with Novak's **Chrome-Shield Protection™**. Chrome-Shielding is the result of a metalizing process that deposits a layer of highly conductive metal directly onto the surface of the case, providing the Mercury with **superior noise attenuation** and **increased range**. The chrome case also increases the receiver's immunity to radio noise, protects against interfering signals, and blocks noise coming from the chassis, motor, battery, speed control, and servo.

Novak Electronics...First in technology, first at the finish line.

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •



TRUBLE SHOOTING

by Doug Mertes



Low-Pressure Radials

I had a thought the other day: since off-road guys put a hole in their tires to let out trapped air, what about those new belted sedan tires? Would it work to drill a hole or two in them? Thanks for the help!

VIRGIL
via email

Interesting thought, Virgil, except that sedan folks have to deal with a different set of problems from the off-road set.

Hill-jumpers and dirt-bangers drill holes in their tires or wheels so the air will "whoosh" out on impact on a hard landing, instead of popping the tires right off the rims. For traction purposes, they also want a little more "give" to their tires than the asphalt-lovers do. Touring-car drivers frequently use hard, dense foam, or firm shaped inserts to give their wheel and tire assemblies a harder, more consistent feel. If the paved surface is reasonably clean, slick tires actually work best because the warm rubber's stickiness, not the tread pattern, provides the grip. When you use foam of the same density in both on-road and off-road tires, the sedan tires suffer. The bottom line is, saloon racers like the extra air in their tires; holes aren't necessary.

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, Radio Control Car Action, 100 East Ridge, Ridgefield CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

Get it Dialed, Then Win

I've just recently been introduced to off-road racing, and I bought an Associated RC10B2 about a month ago. I followed the directions carefully, and everything is stock and set up just like the instructions recommended, but I have a few questions. For instance, my car keeps bottoming out. Do I need thicker oil, springs, pistons, or what? My rear tires are also very uneven. When I spin them, they're all lopsided and wiggle, and they don't point in the same direction. My front tires come off every now and then. I've glued them on twice now with superglue, but they still come off sometimes. Should I use a stronger glue?

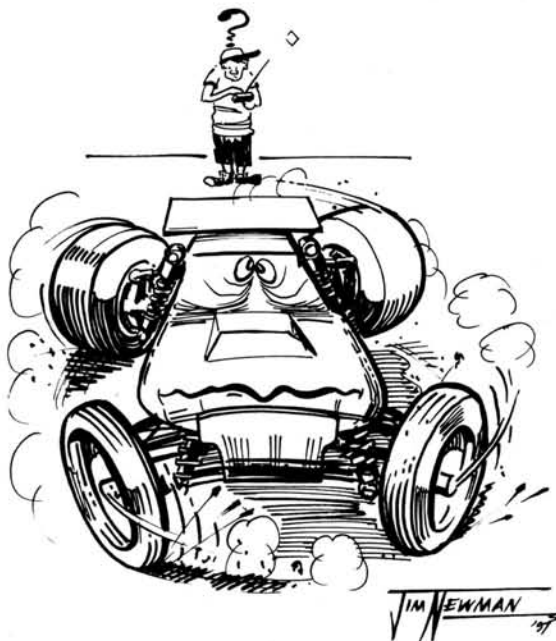
Finally, I bought a used Tekin BC67 charger, and the fuse in it is rated at 20 amps, even though the instructions say to use a 15A fuse. It gets very hot when I charge at a 4.5A rate, so I've been charging at a lower rate and using a fan. Is that OK? Please answer my questions!

JOSE FELICIANO
via email

Jose, I'll bet you have a lot of fun racing your buddies on the off-road track; you'll find it's even neater when all the wheels point in the proper direction! Start by completely removing the tires from the rims and pulling out the foam insert from the tire carcass. It may be wet or bunched up, or there could be a bunch of dirt or dust between the insert and the tire. When you put the foam back in, use a little contact cement to glue it to the inside of the tire carcass so it doesn't shift around later. When you put the tire on the wheel, take your time; be sure that the tire beads are seated firmly in the wheel's grooves all the way around. Glue the tire on with a high-quality, brand-name hobby CA, not the superglue sold by drugstores. Thin stuff will get the job done, but medium will prevent you from gluing your fingers to the tires all the time. Do the same thing to your front tires, but clean the wheels first with hot soapy water and an old toothbrush, then dry them thoroughly. After you've glued them, let the glue cure overnight, if possible. The drive pins on RC10 axles aren't very large, and it's easy to miss the corresponding grooves in the wheels when you mount them and tighten

the nuts, so be sure the wheels drop completely onto the drive pin.

You can prevent your car from bottoming out by experimenting with different weights of shock oil (thicker oil will slow down the rate at which the shock compresses) and springs (heavier springs will resist compression more effectively). Later, you can fine-tune your work with ride height (spring preload) and piston changes. As far as the Tekin charger goes, toss the 20A fuse! That charger was designed to be protected by a 15A fuse; using a higher-rated one only means you could fry more of the expensive circuitry if something goes wrong. All chargers get very warm when cranking packs at a 4.5A rate or higher, so using a fan is a good idea to control the heat. Good luck!





TROUBLE SHOOTING

Glitching Got You Down?

I bought an Associated RC10T with a Novak Rooster speed control and a JR Python radio. Everything else on the truck is stock, and it runs well except when it glitches. I run it here on my driveway in Ohio, so I don't think there's any source of interference. The only thing I can think of is dust getting into my receiver. I cleaned off the receiver and noticed that it rattles when I shake it. Could this be my problem?
JOHN NASON
Vickery, OH

underground power lines weren't causing the problem. Since all of this equipment worked flawlessly in my Losi Double-X 'CR' and Associated RC12LS, I have completely run out of ideas. Can you help me?
COLIN BOMBARA
via email

My Team Losi Double-X 'CR' is becoming more and more of a pain. It twitches and glitches; whatever you call it, it's frustrating! At first, I thought the problem might be my graphite chassis, but it wasn't. I've changed the receiver, the crystal and the motor, but nothing got better. It couldn't be the ESC, because the front wheels were twitching, too. After raising the antenna and finding that the car still glitches, I've decided it must be the servo. Is this possible, and do you have any other ideas?

JEFF MARKS
Coral Springs, FL

Of all the challenges we face in this hobby, radio interference, or glitches, are easily the most common, most confusing and most frustrating to solve.

There's no magic to solving radio conundrums; it just takes a methodical approach and a willingness to accept the fact that any single component—and sometimes several—in the collection of electronic gizmos we put into our cars and trucks can be the source of misery.

Be certain that your electronics are in generally good shape, with no obviously frayed wires or open connections that can short out and cause a loss of power or control. Receiver antennas should never be shortened or cut; I always use the longest antenna tube I can find to put as much of my receiver wire as

possible in the air above the vehicle. I run any excess wire down the outside of the tube and secure it with O-rings. Hidden and under-body antennas are a frequent source of radio problems, especially in a parking-lot environment in which your signal can bounce all over the place. Older servos, especially FET-assisted high-speed or high-torque servos, or boosted ones that use a fourth wire, can be real amp hogs. They can pull down the available power until the receiver is too starved for voltage to operate properly. Sometimes, the voltage regulator in a speed control malfunctions, and this may reduce or eliminate the source of receiver power. If your system works fine with a 4-cell pack plugged into the receiver but doesn't work at all when it's removed, it may be because of a faulty voltage regulator.

Much has been said about the need to route power wires and antenna leads properly, especially when they run close to or on top of a conductive material like aluminum or graphite. Generally speaking, it's a good idea to keep your receiver as far away as possible from noisemakers like servos and motors, as well as from the magnetic fields generated by positive and negative power leads that run from the battery pack to the ESC and motor. How much voltage are the batteries in your transmitter producing? Even the best alkaline cells won't last forever. To maintain their base voltage levels, AA-size Ni-Cds really should be charged between heats, if at all possible, especially if you're using power-hungry FM or PCM systems. Finally, be sure to fully extend the transmitter antenna; reducing its length even a little can dramatically shorten your

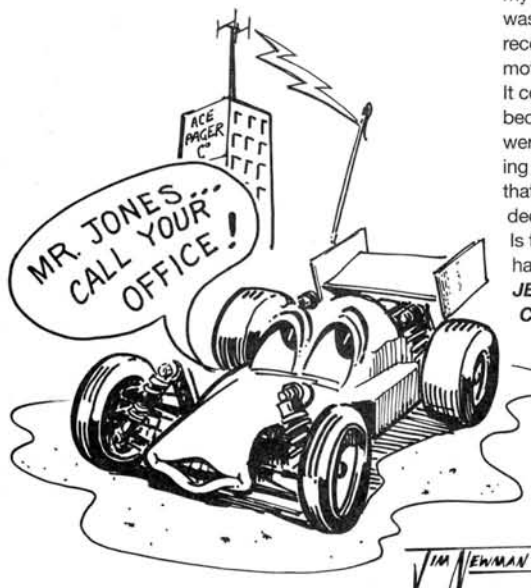
radio's range.

John, I suggest you inspect your truck with this article in hand; your problems could be caused by any of the situations I've described. Although it's possible that some small electrical component has come adrift inside your receiver's case, it's unlikely that enough dust or dirt has entered it to do any damage. Folks at your stage of experience in the hobby frequently forget about their transmitter batteries, so that may prove to be at the root of the problem.

Even though you run the truck in your driveway, there may be sources of interference nearby. Many of us have been surprised by neighbors who have super-strong ham radio systems, kids a block away who are using the same channel we are, or paging companies that have towers on roofs in your vicinity.

Colin, you sound as if you've had a lot of experience in the hobby, so I'll cut right to the chase: although you've insulated the motor's endbell (and, I presume, the can) from the chassis, did you think of insulating the motor mount from any electrical path? I've exchanged email lately with a few Yokomo YR-4 'M'-chassis owners who have experienced exactly this kind of interference. Run a piece of thin tape between the motor mount and the graphite chassis, and I bet your problems will be over!

Jeff, it's unlikely that your servo is the source of your dilemma. My suspicions center on the transmitter or the transmitter crystal. See if you can find another radio to use; that may solve your problem. If it doesn't, try plugging a 4-cell pack into the battery slot in the receiver; perhaps you're just not sending sufficient voltage to do the job properly. ■



I read *Car Action's* review of the Roadrunner Xpress several months ago, and based on that article, I went out and bought one. Unfortunately, I have been unable to race it yet because of the terrible interference problems I've been experiencing. As soon as the car gets 50 feet away from me, it becomes uncontrollable. I've tried two different transmitters, three different motors, two servos, new capacitors, crystals and diodes, a separate receiver battery, insulating the motor endbell from the chassis and re-routing the power wires and the antenna. I even tried running the car in a different area to ensure that



by George M. Gonzalez

Color Your R/C Car

A FEW ISSUES BACK, we dedicated a "Concours Corner" to dressing up your R/C chassis. You may recall that one of the flashiest ways to do this is by using colorful anodized-aluminum hardware. Quite a few R/C companies sell anodized-aluminum hardware for the more popular cars

and trucks. All you have to do is replace your vehicle's aluminum pieces with the new anodized pieces, and you've finished—very simple, but also very wasteful. Why would you want to replace your perfectly good aluminum components?

Enter 12-Pak Racing & Custom Anodizing*.



Here's a complete RC10B2 anodized kit. If you want just a single, solid color, 12-Pak offers a rainbow of colors to choose from.



Now you can send your aluminum parts to be anodized for less than the cost of buying pre-anodized components from various companies. In addition, you'll be able to choose from any of the 24 colors and variegated patterns available through 12-Pak Racing. The company also offers a polishing service for those who prefer polished chrome to color anodizing.

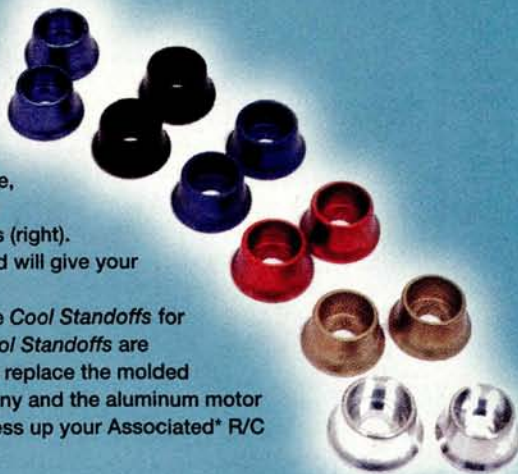
Now this is what I call a cool anodizing job. Both Associated RC10T2s feature variegated anodizing jobs. Although you can't see the flip side, the rest of the trucks' aluminum parts have been anodized to match.

COOL NEW PRODUCTS

While we're on the subject of anodizing, the folks at Factory Works* are always on the lookout for ways to make our R/C cars look better. Take, for instance, their Ah Cool Things 4/40 and 3mm socket-head-screw dress-up washers (right). They come anodized in several colors and will give your car or truck that cool factory look.



Also from Factory Works are these Cool Standoffs for Associated cars and trucks (left). The Cool Standoffs are machined from high-grade aluminum and replace the molded standoffs that fit between the Stealth tranny and the aluminum motor plate. No doubt, this is a great way to dress up your Associated* R/C car or truck.





THE MOST FREQUENTLY ASKED QUESTIONS

• How do you go about having your aluminum components custom-anodized? The best way is to call 12-Pak and order a color chart and price list. You'll then be able to see all the colors and patterns before you send in your parts. Once you've decided on a color or pattern, fill out the order form and send your parts to 12-Pak.

• How long does it take? Processing takes one to two weeks for custom-anodizing. Polishing takes an additional week. Of course, all turnaround times are approximate and do not include shipping time; 12-Pak offers next-day and two-day UPS shipping for an additional cost.

• How much does it cost? That depends on how many aluminum pieces you send for custom-anodizing. A complete Associated

Top right: here's another RC10T2 with some rather flashy anodizing. This complete package cost around \$80. If you choose not to anodize the axles and suspension-arm brace, you'll save \$20.

RC10T2 (including chassis, all four shock bodies and shock caps, two-piece motor plate, chassis nose plate, nose-plate supports, front suspension-arm brace and front axles) will cost less than \$80. You can save more than \$20, however, if you choose not to anodize the front axles and suspension-arm brace (these parts are hardly seen anyway). A complete Kyosho Inferno ST will cost roughly \$90 to anodize (that includes both upper and lower chassis plates, steering-bellcrank support, all four shock bodies and shock caps, front shock tower and front suspension-arm brace). Prices vary, so it's best to confirm the cost

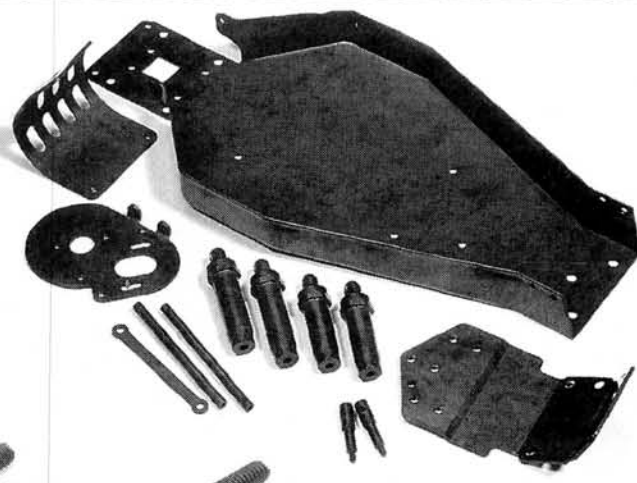
of your order before you send out your parts.

• What if my parts are already anodized? Anodized parts can be re-anodized at no extra cost. After all, most aluminum R/C parts are already anodized black or some other color. To remove the anodizing and leave a fresh aluminum surface, 12-Pak gives your parts an acid bath, and then they're ready to be anodized again.

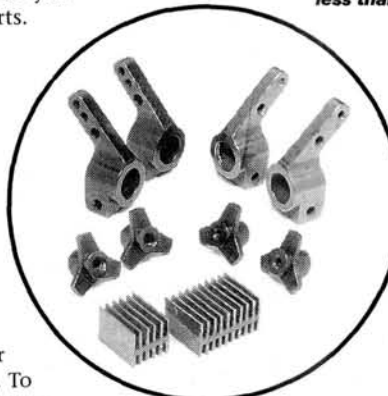
• Which R/C car components can be anodized? Only the aluminum parts; 12-Pak can chrome steel parts as well, however.

If you're like me, you've probably already started taking apart some of your R/C cars so you can get the aluminum components anodized. There is no doubt in my mind that 12-Pak Racing offers a wonderful service for all of us aesthetically minded racers. I hope that you enjoyed this month's "Concours Corner." Well, until next time

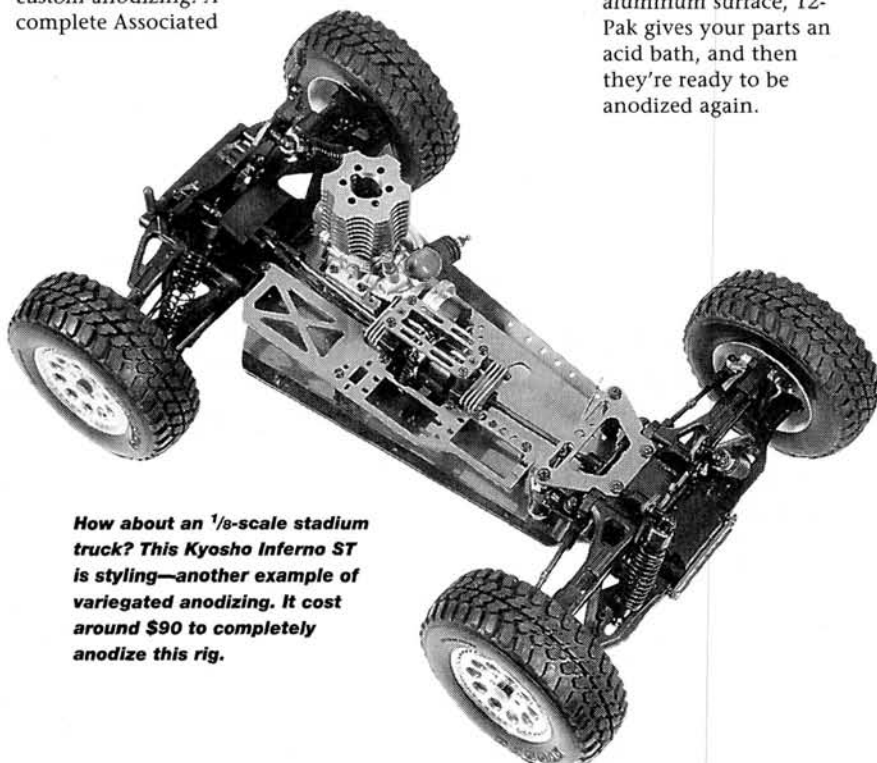
**Addresses are listed alphabetically in the Index of Manufacturers on page 200. ■*



Left: how about screws? If you're willing to send 12-Pak a complete set of aluminum screws, they will anodize them for 12 to 20 cents each. This is very inexpensive; a complete car will cost less than \$15.



Use your imagination. Any aluminum part can be anodized. ESC heat sinks, wheel knock-offs and axle carriers are some examples.



How about an 1/8-scale stadium truck? This Kyosho Inferno ST is styling—another example of variegated anodizing. It cost around \$90 to completely anodize this rig.

PRODUCT WATCH

Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



58 Double-XT 'CR' Aluminum Pieces



60 LRP ICS Digital Speed Control



62 Performance Hobby Modified Motor Bearing Repair/ Replacement Tools

FANTOM Double-XT 'CR' Aluminum Pieces

DO THEY HELP OR
HURT PERFORMANCE?

HAVE SOME of Fantom's anodized-aluminum parts on my Losi Double-XT 'CR.' I like them a lot: they're purple, and shiny, and just plain neat-looking. I outfitted my truck with a rear aluminum bulkhead, a front suspension brace, a tranny brace and some of their upper shock mounts. Yes, my truck is real purty; all my racin' buddies at the track think I have one of the best-looking chassis around. Hey, if you're not the best racer, it's cool to at least look good out there!

Recently, Team Losi had a few things to say about aluminum bulkheads in their "Tech Talk" column. Losi warned racers of potential damage to their vehicles if these bulkheads are used. When I heard this, I was concerned about my truck, so I spoke with Team Losi's Jack Johnson. He informed me that the column was aimed directly at front aluminum bulkheads, not rear ones like my Fantom bulkhead. According to Jack, the front bulkheads on Losi's buggies and trucks are made of a slightly softer material that's better able to handle an impact. This softer material (which is attached to the front hinge of the chassis) absorbs shock better than a more rigid material would, and it will flex, not break, on impact. (If it broke, so would the whole chassis.) Since the aluminum bulkheads are much more rigid than the softer plastic ones, they don't "give" and may break the chassis on harsh impact. When I asked Jack about the rear aluminum bulkheads, he said they were fine; they just weigh slightly more. The same goes for the front suspension arm brace: it looks good, but weighs slightly



Fantom front brace.

more. The shock mounts and transmission brace also fall into the "structurally OK" category.

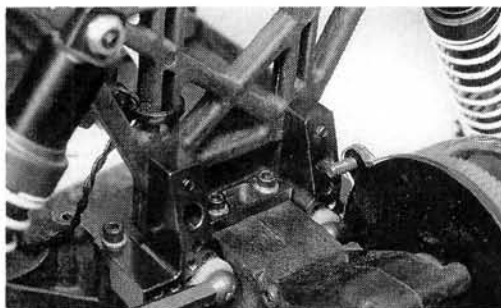
Do these pieces make you go faster? No. Do they save weight? No. Do they add weight? Not an excessive amount. What do they do? They look awesome. I and anyone else who sees them, really dig 'em.

All the Fantom pieces I spoke about are available in natural, blue- and purple-anodized finishes. If you want to trick out your truck and stand out in a crowd, I recommend you take a look at Fantom's aluminum items for the Double-XT 'CR,' or any other vehicle. They're high-quality products that really add personality to your rig.

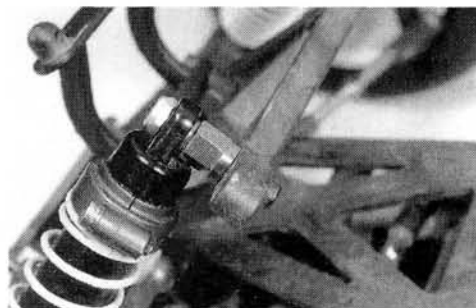
—John Howell

Part nos. and prices:

- F348—rear bulkhead (\$35)
- F349—transmission brace (\$9)
- F351—front brace (\$9)
- F352—shock mounts (\$16)



Rear bulkhead and transmission brace.



Shock mount.

PHOTOS BY WALTER SIDAS

LRP ICS Digital Speed Control

CAN YOU TELL the difference between a brand "N" and a brand "T" speed control? Many drivers swear they can; they choose one brand for smoothness in their pan car and another for punch in their off-road buggy. These days, even though racing ESCs are highly tunable, many drivers say there are inherent differences among them. LRP's new ICS Digital, in addition to having the usual host of racing features, is capable of adapting to your driving style.

"Sounds good," you say, "but who the heck is LRP?" They are a German manufacturer of electronic speed controls that are popular in Europe. With the help of Associated's* distribution expertise, LRP has gained popularity in the States. Another important fact is

TESTING THE CURRENT OFF-ROAD WORLD CHAMP

the world championship victories of Matt Francis and Mark Pavidis, both of whom raced with the very same ICS Digital unit featured here. Think about it: world championship technology, off the shelf—another reason to love this hobby!

Let's talk features. The ICS Digital uses cool-switching FET technology to eliminate the need for heat sinks. Reducing weight isn't the most important issue, though; when an ESC is so efficient that it wastes virtually no energy in the form of heat, you know you will get the maximum power and run time from your battery.

Setting up the LRP unit is a breeze, thanks to its push-button setup. Unlike the

press-it-once, hit-gas-and-brake setup procedure of some other ESCs, you press the ICS's setup button once for each function: neutral, throttle and brake. The unit informs you where you are in the setup sequence by flashing its two LEDs and sending low-frequency pulses to the motor; it then beeps in response to each accepted setup input. Pretty clever! Although it takes a few extra seconds to program with this system, the ESC's confirmation of each setting is reassuring, and when the car "talks" to you in the pits, everyone is impressed!

There's more. The ICS has an individual adjustment pot for the brake. This allows you to adjust your vehicle's brakes without altering its overall braking power. With the pot turned completely counterclockwise, braking is very smooth and linear—similar to the

effect of a slow, steady press on a full-size car's brake pedal. When you turn the pot clockwise, the braking becomes more aggressive. If you crank the pot clockwise until it stops, it will act as a

"hand brake," as LRP describes it (probably because this setting is akin to reaching down and yanking the emergency brake while motoring down the highway). But no matter which setting you choose, total braking power can be adjusted with your radio's throttle EPA/ATV low adjustment.

Perhaps the ICS's best feature is its current limiter. "Big deal," you may say. "Everybody's got a current limiter these days." But this is no ordinary current limiter. First, don't look for an adjustment pot or an itty-bitty dial; the ICS uses a plug-in chip to set the amp value. You can choose 30-, 50-, 65-, 80-, or 120A chips (all are included) or skip the chips entirely to shut off the torque limiter. But this chip business is only half the story. To further increase the versatility of the ICS, characteristics of power delivery can be altered via different "programs." A corner of each square torque-control chip has been nipped off to serve as a pointer. In program 1, if you install the chip with the pointer in the upper right corner, you lose a little punch but are rewarded with maximum efficiency and the smoothest possible throttle response. When you turn the chip so the pointer is in the lower right corner, it delivers more punch, but at the expense of some drivability and battery efficiency (this is program 2). I found using the chip system much easier than trying to read the setting of a pot or turning a microscopic dial. If you simply cannot live without an infinitely adjustable torque-control potentiometer, LRP offers one; you plug it in where the chip would go, and its plug can be positioned for punch or efficiency just as the chips can.

To round out the ICS Digital's package, LRP includes a little tool

for pressing the setup button and adjusting the brake pot, a Schottky diode to prevent "brake-fade" and the correct capacitors to ensure glitch-free fun. If you have a manly FET-boosted servo in your arsenal, the ICS is pre-wired to deliver the juice you need. Finally, a complete set

of instructions is included, but they require a little extra concentration. All the info you need is there; it just isn't presented in the clearest format.

Enough technical mumbo-jumbo; let's drive. I had the pleasure of

(Continued on page 62)



Specifications

Weight: 42gm
Input voltage: 4 to 10 cells
@ 1.2V/cell

On resistance: unavailable
Rated current: 450 amps
Braking current: 140 amps
PWM frequency: 2690Hz
BEC: 5.7 volts
Schottky diode: external
Wire size: 14 gauge
Receiver plugs: Futaba

Features: current (torque) limiter, selectable power program, adjustable brake, regenerative braking, switch-on/off impulse suppression.

Setting up the LRP unit is a breeze, thanks to its push-button setup. Unlike the press-it-once, hit-gas-and-brake set-up procedure of some other ESCs, you press the ICS's set-up button once for each function: neutral, throttle and brake.

(Continued from page 60)

testing the ICS in HPI's* new RS4 Pro along with an Associated Tri Sonic "Y" 10-turn motor. There's a challenge for any ESC! My first test wasn't for speed, but for slowness. A speed control that doesn't operate smoothly won't be able to make a car creep at a snail's pace without a lot of herky-jerky action. Although the ICS's 2690Hz PWM frequency isn't shockingly high, it's sufficient for smooth throttle response. (If you were an R/C hobbyist during the era of 60Hz controllers, you know how spoiled we have become.)

After the important-but-dull crawl test, it was time to open things up. I wanted to see how well the chip-controlled torque limiter worked, so I performed a few packs' worth of full-throttle launches at different amp settings. With the 10-turn motor yanking big amps through the ESC, this also proved a good test for any tendencies to overheat. Launch after launch, the LRP barely moved a click above ambient temperature. As for the torque control, it worked like a charm. I found the 50A chip to be almost perfect for taming the 10-turn motor in the slipper-less RS4 Pro. With the chip removed, things got hairy; but boy, did that RS4 Pro move! I also played with the chip's position, as I mentioned earlier. The difference between the two settings is subtle, especially with a power-hungry motor like the Tri Sonic "Y." When I swapped the big mod for a competition stocker, the difference between the settings was more apparent, and run time increased by about 20 seconds in the peak efficiency mode when I ran a pack until it dumped. Think of the chip's position setting as a fine-tuning of the torque output; for instance, if the 50A chip at maximum efficiency isn't "torque-y" enough but the 65A chip is too much, try the 50A chip in the punchier position.

Powerful brakes are a must for racers (or any hard driver), and the Schottky-diode-fortified ICS has plenty of "whoa" power. I played with the brake pot and found its effects more noticeable with a stock motor than a mod with less torque. I found that using the more linear brake setting (pot turned counterclockwise) allowed a wider range of adjustment for drag-brake without any danger of locking the rear wheels. If you want head-snapping stops, the "hand-brake" setting will just about rip the tires off the car. Best of all, you can suit your personal style by choosing any setting between these two extremes.

Hmm, personal style; those are good words for this high-quality ESC. With the adjustable brake, throttle response "programs" and multi-step transmitter setting, the LRP ICS Digital can be finely tailored to the way you want to drive. This isn't a 1/12-scale ESC or a truck ESC, it's a topnotch piece of equipment for any driver and any car. Add durability, cool running, smooth control and easy setup, and you have an ESC that's tough to beat. Just ask Matt Francis and Mark Pavidis!

—Peter Vieira

PERFORMANCE HOBBY

Modified Motor Bearing Repair/Replacement Tools

REMEMBER "The Liars Club"? It was a really bad Merv Griffin-produced game show on which celebrity has-beens (Charles Nelson Reilly! Paul Lynde!) examined an object and then gave an opinion on what it was supposed to do. Only one celeb would have the real story, and the contestant who picked the correct story won.

Performance Hobby's* new motor bearing tools remind me of that show because without their instructions, I couldn't have guessed what the heck they were for. But once I realized what they were for, I decided they had been brilliantly designed. After a few motor rebuilds with these gizmos, you'll wonder how you lived without them.

There are three tools in the set: a bearing-removal punch, a can-bearing installer and an endbell-bearing installer. The punch is a no-brainer; just line it up with the bearing and tap away. Sure; there are other ways to get a bearing out, but the punch does the job without side-loading the bearing or denting its fragile shields. If you're still pressing out bearings with the butt of an Allen wrench (or something worse), you'll definitely want to get this set of tools, if only for the bearing punch.

Once the bearings you've popped out are ready to be rein-

DON'T BUST YOUR BEARINGS

stalled, reach for the two installation tools. The tool that resembles a miniature "Fat Man" atom bomb is for installing the bearing that resides in the nose of the motor can. "Why is the tool so fat?" you ask. Good question. The bulging midsection



just happens to be the same size as a motor armature; the tool just slides along the magnets and presses the bearing into the can like it's on autopilot. The bearing doesn't fly off the tool into the magnets, either. That used to drive me crazy!

To reinstall the endbell bearing, Performance Hobby offers another tool that is designed similarly to the "Fat Man" tool. This time, the tool replicates the commutator so it can sneak between the brush hoods without getting hung up. Like its portly mate, it presses the bearing straight in—no muss; no fuss. You'll have your mod motors back up to spec in record time!

Aside from writing my name and "Return to my box" on them, I can't think of a way to improve these tools. All three are expertly turned from solid nylon, they fit precisely and function flawlessly. They've made my bench time easier ... and that's no lie.

—Peter Vieira



*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

thrash
TEST

1/10 scale gas

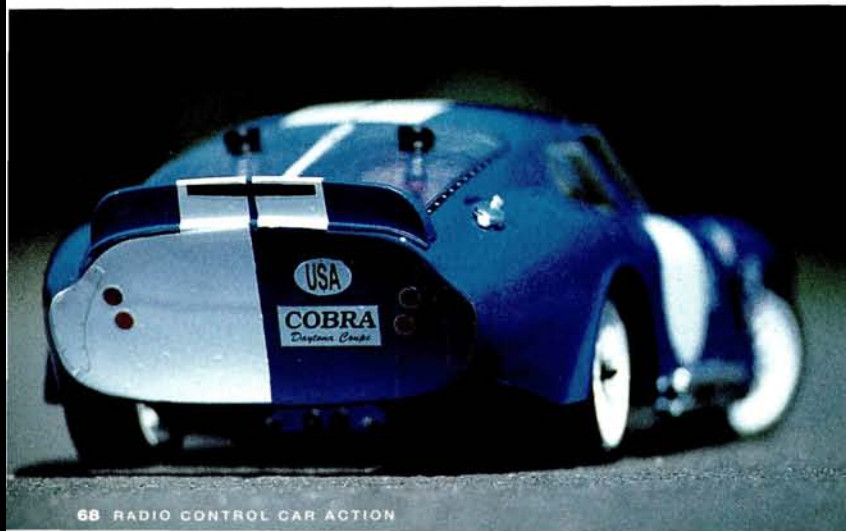


KYOSHO

Pure Ten Spider Full Option

by Frank Masi

ACCORDING TO THE American Heritage Dictionary, to be nostalgic is to "long (bittersweetly) for things of the past." Recalling the days when "sports car" meant powerful, exotic (often synonymous with "finicky") powerplants wrapped in curvaceous, even (gulp) sexy sheet metal, automotive historians philosophize that today's high-performance cars lack the "soul" of their sixties progenitors. Ah, the '62 Ferrari 250 GTO, the Ford GT-40, and '67 Corvette Stingray big-block. They just don't make them like that anymore. Well, dust yourself off, gramps, they do.



PHOTOS BY WALTER SIDAS AND JOHN HOWELL

Building a World Cup winner



Specifications

SCALEPure Ten
LIST PRICE\$299.99 w/o options

DIMENSIONS

Length overall375mm/15 in.
 Wheelbase260mm/10.4 in.
 Width203mm/8.12 in.

WEIGHT (gross RTR) 3 lb., 8.6 oz.

CHASSIS

TypeStamped lower plate/upper radio tray
 MaterialDuralumin/carbon fiber*

DRIVE TRAIN

TypeTriple-belt drive; 8.65:1 ratio
 Transmission2-speed auto shifting*
 Differential(s)Ball diffs*
 Bearings/bushings20 ball bearings*

SUSPENSION (F/R)

TypeInd. A-arm w/upper link
 DampingOil-filled, coil-spring shocks*

TIRES (F/R)Kyosho High Grip slicks*

POWERPLANT

EngineKyosho GS11X
 PipeKyosho Tuned Exhaust Set*
 CarbRotary barrel

*Indicates optional item.



Participants in the first World Cup finals held in the Philippines.

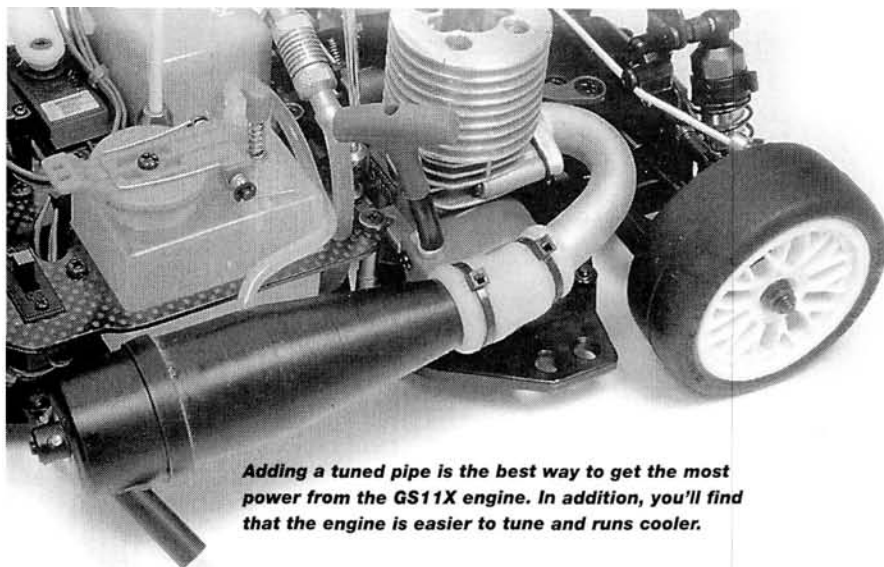


THE KYOSHO WORLD CUP

Each year, Kyosho organizes the World Cup—an international racing series exclusively for the Pure Ten Nostalgic Series cars. In the U.S., the World Cup consists of three, regional, "qualifying" events, the winners of which have the opportunity to travel the finals—to be held next year in Tokyo, Japan. Racers from other countries also participate in similar events in hopes of making the finals.

Besides the uniqueness of the Nostalgic cars themselves, the World Cup differs from other series in that it emphasizes teamwork over individual achievement. Teams of two to three drivers/mechanics share the wrenching and driving duties equally (World Cup rules require mandatory driver changes). Often, it isn't the fastest car that wins, but the team who work best together.

From its Le Mans-style starts (at the beginning of the finals, mechanics must run to their cars and start them for their drivers) to the stunning Nostalgic cars with their realistic sound and shifting gears, the World Cup is perhaps the most exciting racing program of recent memory. For more information on how to participate in the World Cup, contact Great Planes Model Distributors Co. (Kyosho's U.S. importer) at (217) 398-6300.

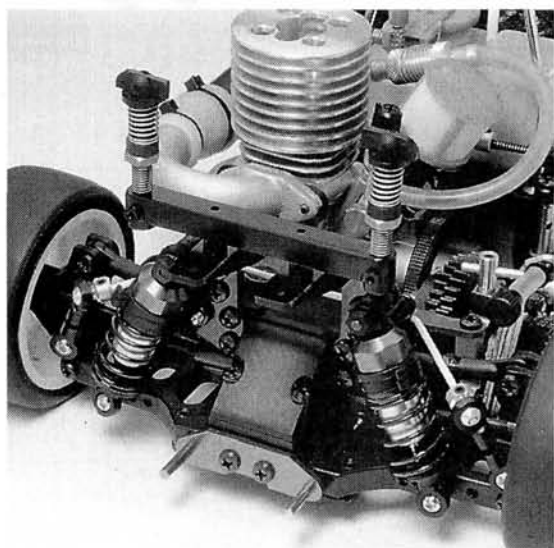


Adding a tuned pipe is the best way to get the most power from the GS11X engine. In addition, you'll find that the engine is easier to tune and runs cooler.

PURE TEN SPIDER FULL OPTION



One of the first things you should add to any gas car is a good fuel filter. Kyosho's Maximizer filter does a fine job of keeping the crud out of your carb, and it can easily be disassembled and cleaned.

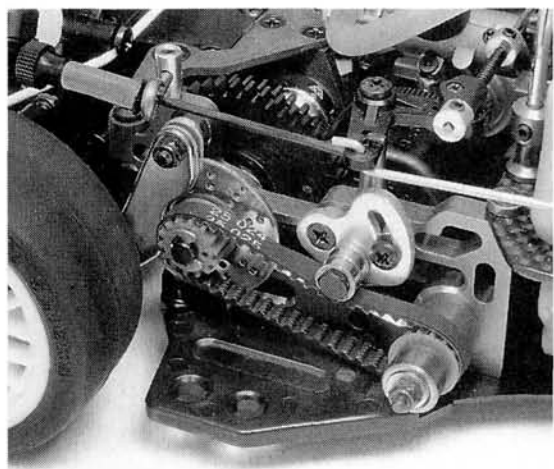


Oil-filled shocks are among the most important modifications you can make to the Pure Ten Spider. These are Kyosho's optional touring shocks. Also shown are the optional toe-angle adjuster plate (part no. SPW01) and quick-release body mounts (no. 39502).

When referring to the development of new R/C car trends, Kyosho* is known for taking "the road less traveled." Nowhere is this more in evidence than with Kyosho's Pure Ten Nostalgic Series: glow-powered, 4WD replicas of some of the hottest road and racing-cars from the golden era of high performance—cars with soul, if you will.

Kyosho's GP-10 Spider chassis has proven itself a capable platform that's worthy of the heritage of the vintage racers whose bodies adorn it. It's quite a performer, especially with the addition of a few carefully selected hop-ups from Kyosho's catalogue. That's the gist of this article: to duplicate the Pure Ten Spiders that compete in Kyosho's World Cup series (see our coverage of the World Cup in the August issue).

Even the sound of the engine takes on a menacing quality when fed through the tuned pipe—all the better, as it enhances the audibility of the transmission's precise gear changes.



An optional, blue-anodized aluminum center gear mount firms up the center section of the chassis. It also provides a firm mount for the brake/throttle lever, center-belt tensioner, disk brake and 2-speed transmission.

HOT MODS

As mentioned, Kyosho's GP-10 Spider 4WD chassis is well suited to the Nostalgic Series. In box-stock form, however, the chassis requires a few additions to qualify as truly race-ready. The following are modifications made using only Kyosho parts (as per the World Cup rules, only Kyosho parts are allowed). They are listed in order of necessity, from the must-have to the really-don't-need-it-but-it-looks-so-cool. The part numbers here are manufacturer numbers; your Kyosho distributor's numbers may differ, but you will still be able to order using the numbers provided.

■ Absolutely necessary upgrades

• **Shocks.** First, the stock kit doesn't have oil-filled shocks; this is the

(no. W5097) reside at the upper end of the pricing spectrum. We chose the Touring Oil Damper set (no. W5151) for this project. They're moderately priced, operate very smoothly and look great with their purple-anodized caps.

• **Ball bearings.** The importance of swapping the kit's bushings for bearings runs a close second to adding oil shocks. To convert the entire car's bushings to bearings, you'll need four 8x14mm bearings (two are needed to support each diff) and 12.5x10mm bearings (four support the two center shafts; the remaining eight support the drive shafts).

If a full bearing conversion is out of your budget, may we suggest that you invest in the four

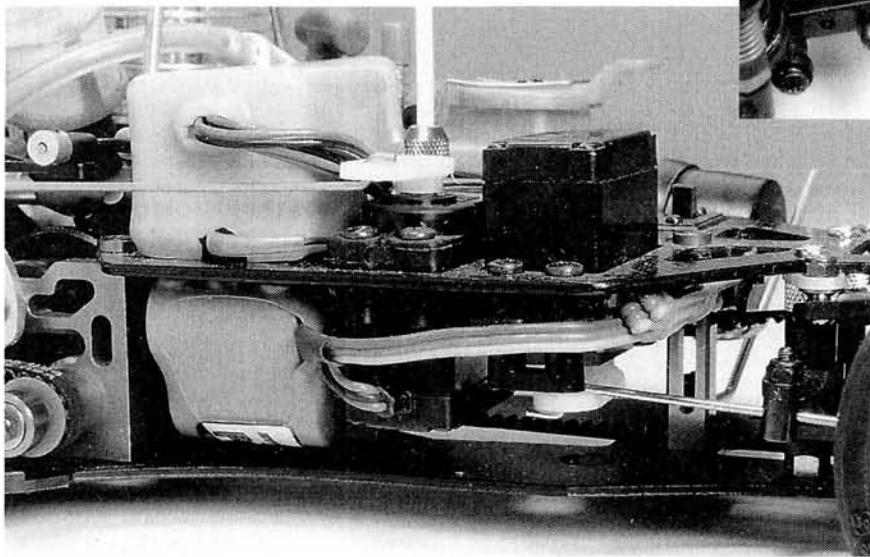
PURE TEN SPIDER FULL OPTION

10x14mm bearings first. Then you should at least buy four 5x10mm bearings for the center shafts. To achieve top performance, though, you should eventually equip the entire chassis with bearings.

- **Filters.** Yes, filters are essential to keep your engine running strong (and long!). For some reason, few manufacturers give you a fuel filter with their kits. Even the tiniest bit of crud in your fuel tank can make its way into the engine and cause trouble, so you should add Kyosho's Maximizer fuel filter (no. 39308). We swapped the GS11X engine's small foam filter for Kyosho's larger filter (no. 39645),

competition, you need something a bit stickier. Kyosho's High Grip Slick Tires (no. 92442, standard-width, and 92551, wide) are just what the doctor ordered. If you don't use the original Nostalgic wheels (as we didn't) but instead opt for Kyosho's Mesh Wheels (no. 92445, standard-width white wheels), you'll need to install the thicker drive washers (no. OT19) to prevent the wheels from rubbing against the hubs.

- **Rather essential bits**
- Universal swing shafts



The carbon-fiber radio tray adds support to the main chassis. For our Cobra Daytona, we chose a pair of Airtronics* 94158 servos and a Dynamite* 5-cell, 600mAh battery pack. The Airtronics FM receiver is protected from fuel and dirt by Kyosho's molded receiver cover.

which provides a larger surface through which the engine can breathe. [Editor's note: the smaller filter is shown in the photo.]

- **Tuned pipe.** Consider this a must—if you want your engine to make righteous power, that is. The stock kit's expansion-chamber muffler belongs on an airplane, not a Daytona Coupe! Fortunately, Kyosho offers several alternatives. Mounted on the rear of the car, the Scale Muffler Set (no. 39512) allows a realistic-looking trail of exhaust smoke to exit from the back of the body. Although an improvement over the stock muffler, this unit is still not considered a real tuned pipe. For the best engine performance, ease of tuning and lower engine temperatures, the Tuned Exhaust Set (no. 39518) is the only way to go.

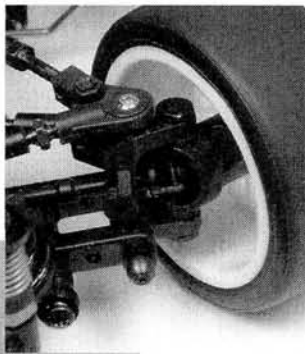
- **Tires.** Kyosho's Classic Pattern tires are OEM on the Nostalgic Series cars; they look great and last a long time, but for

(no. W5065). These replace the kit's rather inefficient dogbones and axles and are essential for smooth power delivery. Universal shafts also allow the steering and suspension to function more freely under acceleration.

- **2-speed racing transmission** (no. 39431). This item falls into both categories; you'll need it if your competitors have it, and it's just so darn cool to hear, see and *feel* your car shift gears! This rather simple device (it sounds more complicated than it is) lets your GP-10 dig out of the turns in low gear then rip down the straights in high gear. And yes, it does downshift automatically—perhaps the neatest part of all!

- **Belt tensioners.** Kyosho offers two belt tensioners—one for the center belt (no. SPW058) and one for the front belt (no. SPW055). Both can be adjusted to take up any unwanted belt slack, such as that you'll notice after the belts have stretched

with use. Of the two, we highly recommend the center belt tensioner, as this belt is subjected to the greatest force. The front-belt tensioner is more of an insurance policy, as we've never had a front belt skip when *not* using one.



Up front are Kyosho's upper "A-arm" suspension links and efficient universal-joint drive shafts.

- **One-way unit.** Adding Kyosho's Center One Way Unit (no. SPW057) allows the front wheels to coast freely in a forward direction, yet still retain drive power under acceleration.

This increases the car's on-power steering (you'll be able to turn more tightly under acceleration), but the car loses its ability to brake using all four wheels.

- **"Diff"-erent options.** The GP-10 comes equipped with bevel-gear diffs. You can adjust the operating friction (tightness) of these diffs by coating the gears with grease of different thicknesses. Or you can seal the diffs with Kyosho's silicone O-rings (no. 96522) and fill the diffs with silicone oil, as is done on 1/8-scale buggies such as Kyosho's own Inferno MP-5. Kyosho sells a variety of silicone diff oil, but we recommend the medium-thickness oil set (no. 1958).

You can also substitute a front one-way unit (no. W5111) for the front diff (this replaces the center one-way shaft), and you can swap the rear diff for a solid axle (no. 92501), which locks up the rear end of the car to allow the car to slide through the turns (recommended for very high-traction conditions).

We selected a pair of Kyosho's adjustable ball diffs (no. 39506) for our Daytona Coupe. They're easy to build and to adjust, plus you can basically "set 'em and forget 'em." We always like that.

■ **Not really needed but cool anyway**

- **Center gear mount.** This is a crucial, structural part of the GP-10's chassis; it functions as a support for the center drive shafts, holds the brake lever and strengthens the center of the chassis. The stock plastic piece works admirably, but Kyosho's optional Metal Center Mount Set (no. SPW052) should eventually make your list of upgrades (and not simply because of its cool, blue color). This anodized-aluminum piece strengthens the chassis, helps dissipate engine heat and provides braking that's more precise (the mount comes with a matching, blue aluminum brake post that's less prone to flexing).

(Continued on page 195)



HPI RS4 Pro

by Peter Vieira

I'LL ALWAYS REMEMBER the first time I saw HPI's* RS4 sedan, back in November '95. It was just a small pic of the prototype chassis in "Inside Scoop," but I knew—everybody knew—that HPI's latest would be a class leader. Suddenly, the shaft-driven car on my bench seemed as antiquated as a Marui Big Bear, and the RS4 was at the top of my "gotta get" list. When the uber-sedan finally arrived, it didn't disappoint. "This car," I thought, "will rule forever."

Time marches on, and in R/C car-dom, it marches pretty quickly; we're talking dog years here. A mere 18 months has brought some stiff competition to the sedan wars. Kyosho, Schumacher, Tamiya, Roadrunner and Yokomo all have world-class contenders of their own that can run with the RS4. But don't think for a second that the HPI crew has thrown in the towel—the RS4 Pro is here to race, and *R/C Car Action* is the first to put you behind the wheel.



How pro can you

specifications

SCALE 1/10
LIST PRICE \$399

DIMENSIONS

Length overall 16.875 in.
 Wheelbase 10 in.
 Width (F/R) 7.25/7.125 in.

WEIGHT (gross, RTR) 2 lb., 8 oz.

CHASSIS

Type Upper and lower plate
 Material Carbon fiber

DRIVE TRAIN

Type Belt
 Primary Pinion/spur
 Transmission Universals
 Differential(s) Ball
 Slipper clutch None
 Bearings/bushings Shielded ball bearings

SUSPENSION (F/R)

Type Lower suspension arm
 w/turnbuckle upper link
 Damping Oil-filled, coil-over shocks

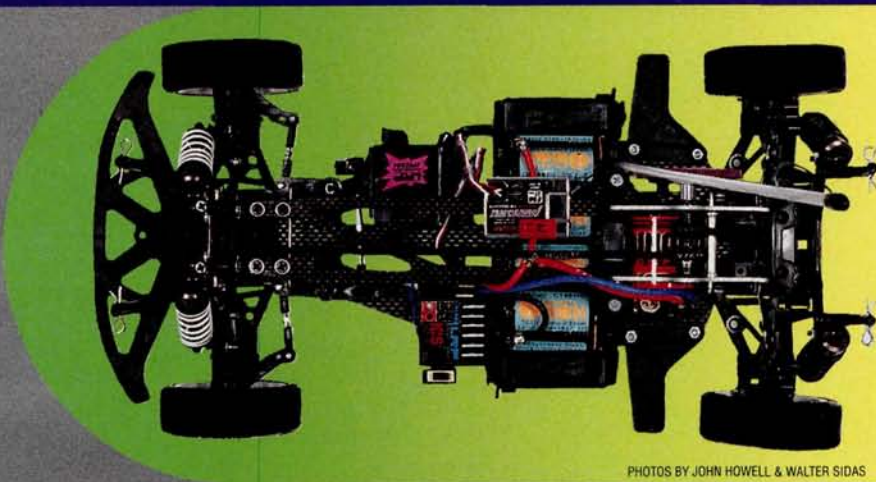
WHEELS (F/R)

Type One-piece plastic
 Dimensions (DxW) 2x0.875 in.

TIRES (F/R) Belted slick w/foam insert

ELECTRICS

Motor, battery, ESC Not included



PHOTOS BY JOHN HOWELL & WALTER SIDAS



go?



Building & Setup Tips

Let Frank Masi build your car! Frank built my test vehicle, and he did a fine job, right down to a gleaming polished finish and beautifully radiused edges on the graphite parts. I made a polycarbonate undertray to protect the work-of-art chassis during my test. They're easy to make: just trace the outline of the chassis onto a piece of polycarbonate (for sources, look in the Yellow Pages under "plastics"), cut it out, and servo-tape it underneath the car.

The following assembly tips are Frank's, as he noted in the manual I was sent. HPI's instruction manual is very clear, but it does not feature a parts legend on each step. There is a master parts legend on page 3 that's handy, but flipping back and forth while you're trying to build is a pain. A clear-plastic metric ruler is a fine addition to your pit box and will let you identify hardware without returning to the parts legend.

• (Step 2) When assembling the diff pulleys and top shaft pulley, use CA sparingly; the shaded instructions seem to show parts being coated with the stuff. Inspect the parts closely to be sure you are assembling them correctly. It's easy to install the diff flanges upside-down.

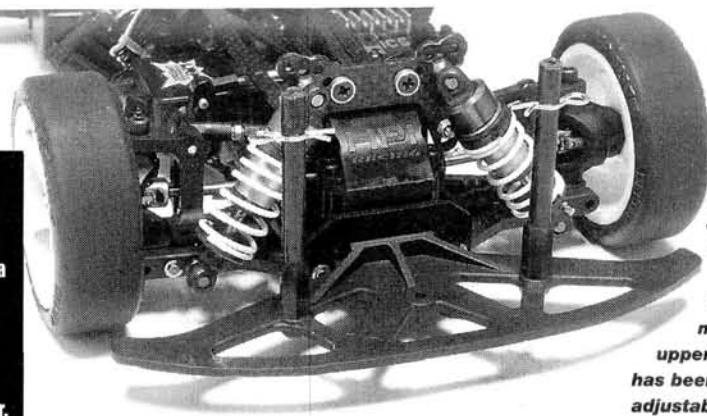
• (Step 3) DO NOT snip off the locating tab on the diff eccentrics. You will, however, want to remove all flashing so that the piece will fit the bulkhead and accept the bearing without binding.

• (Step 4) The rear upper wishbones incorporate a turnbuckle for adjustment, and be sure it is threaded straight into the wishbone. If you're having trouble, try chamfering the hole with a hobby knife. Also, the correct eyelet for the pivot ball is the smaller of the two on the parts tree.

• (Step 7) When installing the screw through the upper wishbone/camber link at the rear of the car, back it off a hair once it is fully seated in the hub to prevent binding. Also, when adjusting the turnbuckles, the pivot will bind on the ball end after the adjustment has been made. To remedy, just rotate the turnbuckle back until the pivot is centered on the ball again.

• (Step 8) The bearings for the steering hubs are a thumb-busting tight fit. Try giving the hubs a hot-water plunge before you press the bearings in. While we're on this step, install the hubs with the numbers facing upward and don't over-tighten the hub pivot screws or the hubs will bind. A little safe-for-plastics thread-lock is a good idea here as well.

• Assembled according to the kit instructions, the RS4 Pro was pretty dialed for the high-traction surface I tested on. I did make some changes to the car to see how sensitive it was to setup changes, and it responded well. The chassis' response to changes was subtle but apparent—just what you need for productive tuning. With some cars, a small setup change can utterly transform their handling characteristics—not so with the RS4 Pro. Be warned, though: the narrow slicks don't respond well to deep camber angles. Keep it mild, and you'll do fine!



RS4 PRO

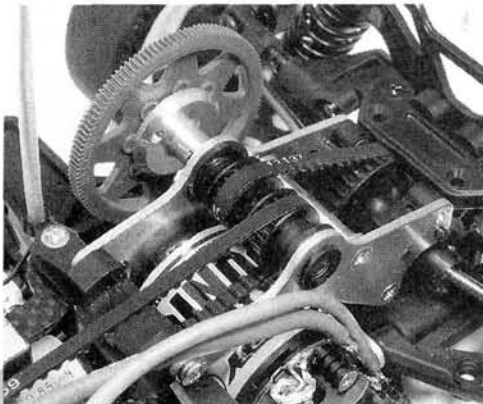
A newly designed front suspension allows the car to handle the track and steer much better than the previous model. Gone is the old upper suspension arm. It has been replaced by an adjustable upper link.

KIT FEATURES

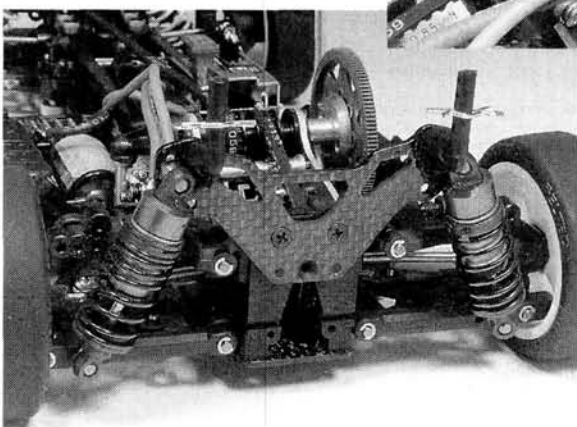
• **Drive train.** The Pro's most notable change from the original RS4 platform is the rear transmission. Gone is the three-gear unit that was in residence; it has been replaced with a minimalist belt version. Although it was silky smooth, the original gear tranny had the same shortcomings as any gear-reduction transmission: extra weight and more rotating mass. The new belt tranny is simply lighter and spools up more quickly. Unfortunately, belt systems are prone to contamination from dirt and debris, which sealed gearboxes easily shrug off. To help prevent pebbles and other potentially destructive particles from damaging the driveline, HPI leaves a generous space beneath the smooth-turning front and rear ball diffs and uses a two-piece bulkhead for the rear transmission. The space between the two bulkhead sides is left open so that any junk that gets in can just as easily get out.

For power delivery, the Pro uses an aluminum motor-mount plate that sprouts off the rear transmission. On the original RS4, a belt-tensioning

pulley was mounted on the plate along with the top shaft; the Pro omits this, and instead uses an eccentric mount for the rear diff to adjust rear belt tension, while the front belt is non-adjustable. The top shaft does not mount a slipper clutch like the original RS4 (not IFMAR legal, dontcha know) but it does feature a one-way pulley for the front diff. The one-way unit allows the front wheels to hook up with a vengeance when the car turns (or any time that the front wheels are turning more slowly than the rears). Power is sent to the wheels via attractively polished universals, which are of fixed length. If



Above: the heart of the RS4 Pro can be seen right here. The new, twin-belt drive-train system replaces the original gearbox and is much more efficient. Left: in the rear, you'll notice that the bulkhead has a "cutaway" section so any "parking-lot" debris can easily pass through the rear drive train without wreaking havoc on the diff or drive belts.



FACTORY OPTIONS

- 2-speed transmission—part no. A297.
- Swaybar set—A209.
- Graphite nerf wings—A206.
- X-pattern Pro compound radial tires—4485.

THINGS YOU'LL NEED

- 2-channel surface-frequency radio set with one standard servo.
- ESC.
- Motor.
- Lexan-compatible paint.
- 7.2V battery (stick pack or 3x3).
- Battery charger.

RS4 PRO

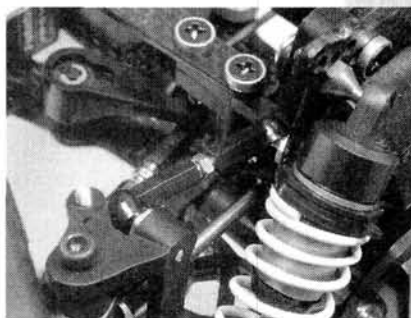
you want to go wide with your RS4 Pro, you'll need a set of HPI's wide-car universals. I should mention that the RS4 Pro's drive train is unequivocally the smoothest I have ever felt. Tell your science teacher that the laws of physics have been broken; this thing is frictionless.

I was able to pitch the Pro into turns sideways well beyond the limits of recoverability for other 4WD cars.

• **Suspension.** The Pro car also sports new suspension systems fore and aft. The biggest changes are up front; the original RS4 linked the front hubs to both the upper and lower suspension arms via ball joints, allowing the hubs to pivot for steering as well as move up and down with the suspension; the new Pro setup uses individual hubs and carriers. The "C"-shaped hub carriers are dedicated to up-and-down suspension action, leaving the front hubs to steering. This system eliminates the need for an upper wishbone and allows a single turnbuckle to be used in its place. In sum, the new design makes for a simpler front end and much easier diff access when compared with the original upper wishbone and bulkhead setup.

HPI has been busy with the rear suspension as well, but the changes are more subtle. New rear hubs offer an additional camber-link option, but you probably won't use it as a tuning aid—HPI has retained the adjustable-chassis-width concept of the RS4, and the new hole is meant to be used when building the car "wide." New suspension arms at each corner are also designed to facilitate the narrow/wide adaptability of the Pro chassis, but the new design does not require cutting the arms. The RS4 Pro can be switched back and forth between wide and narrow settings without swapping

Right: another new feature of the RS4 Pro is the steering assembly. Note that the steering servo is now mounted in a lateral configuration versus the older design's forward-mounted setup. Below: a closer look at the newly designed front suspension reveals how camber is adjusted via a turnbuckle.



Likes

- Easier to work on than its predecessor.
- Confidence-inspiring handling.
- Incredibly efficient drive train.
- Low price for such a well-appointed chassis.

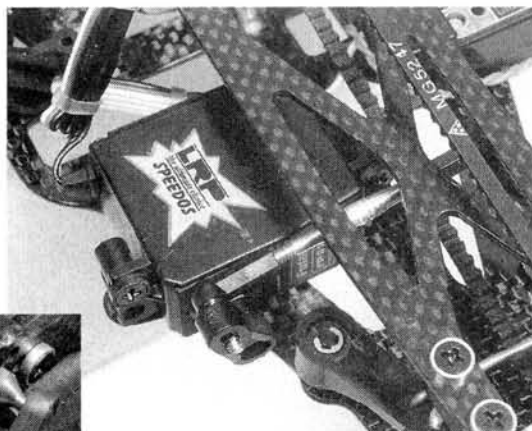


Dislikes

- Limited room for electronics.

arms—very handy! The upper wishbones of the original RS4 round out the rear suspension, and both ends of the car are equipped with braces for the hinge pins; these were must-have durability upgrades for the RS4, but they are stock pieces on the Pro.

To put the "suspend" in the suspension, HPI supply their tried-and-true aluminum body coil-overs with tuned springs. These shocks are very easy to build—maybe a little *too* easy. The seal design calls for a molded stop to be snapped into the shock body to prevent the O-rings from being pulled into the shock under compression. This piece



slipped in with virtually no friction, and it fell out as soon as the shock body was inverted for installation of the O-rings. I gave Kent Clausen a call at HPI to discuss the problem, and he told me to "Just build 'em, they'll be fine." "OK," I said, and sure enough, there is a happy ending: I built the shocks, and they worked just fine. I didn't just finger-test them either; I bolted them into my loaner car and launched it off a sidewalk again and again, with power slide hairpin turns between each launch. The test ended when I broke a hub, but the shocks weren't even moist around the seals. In Kent we trust!

• **Chassis.** While the off-road crowd has made a wholesale switch to reinforced plastics for their chassis, the pavement-pounding set still yearns for graphite—and the RS4 Pro has plenty of it. The upper chassis plate and main chassis are precisely cut from the woven wonderstuff, as are both front and rear shock towers. The new chassis plate allows 6 cells to be mounted in a three-by-three configuration, but most will probably opt for stick packs and HPI's trick, quick-release battery-retainer system (it's included). Once everything's bolted up, the completed chassis is stiffer than the "Pro Graphite" option chassis for the original RS4, but it still has a tiny squidge of lateral flex. Try to flex it fore-and-aft, however, and the RS4 Pro ain't gonna budge. Of course, the best feature of the Pro chassis

the Competition

	HPI RS4 Pro	Roadrunner XPress	Kyosho TF-2 Type R	Schumacher S.S.T. 2000	Tamiya TA03F-Pro	Yokomo YR-4 II	Tenth Technology Predator DTM
Wheelbase	10 in.	10.25 in.	10.19 in.	10 in.	10.1 in.	10.125 in.	10 in.
Width (F/R)	7.25/7.125 in.	7.25 in.	7.38 in.	7.125 in.	7.19 in.	7.7/7.125 in.	7.25 in.
Weight	2 lb., 8 oz.	3 lb., 2.8 oz.	47.8 oz.	3 lb., 7.3 oz.	3 lb., 8.7 oz.	3 lb., 2 oz.	50.6 oz.
Diff type (F/R)	Ball	Ball	Bearing/Ball	Ball	Ball	Ball	Ball
Chassis	Carbon fiber	Carbon fiber	Carbon fiber	Fiberglass	FRP**	Fiberglass	Nylon composite
List price	\$399	\$385	\$399.99	\$319.50	\$356	NA	\$479
Available at*	\$239	\$225	\$299.99	\$190	\$199.99	NA	\$320
Reviewed in	9/97	4/97	—	12/96	10/96	—	—

*Prices vary with location

**Fiberglass reinforced plastic

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RS4 PRO

is the cool graphite look; at the starting line, this car says, "Hello, I'm high tech. I will crush you."

• **Wheels and tires.** HPI has been a leader in the sedan tires and wheels market, so it's no surprise that the Pro features the current state-of-the-art in sedan sneakers: belted super-narrow slicks. These are mounted on HPI's own five-spoke wheels along with foam insets. HPI wheels use the Tamiya-pattern hex socket for mounting, so just about any sedan can mount up a set of HPI hoops in a variety of styles. Once mounted, the super-narrow tires have a lean athletic look, and at 22mm wide, they just make the IFMAR minimum width. The sticky slicks should hook up "killer" on the freshly paved lot I've got in mind for testing. I'm ready!

TEST GEAR

■ **Airtronics* Caliber 3Ps FM transmitter** (27MHz). Top-line, computer-controlled radio with three-model memory.

■ **Novak* Mercury shielded FM receiver.** Shielding provides improved protection against signal loss from interference.

■ **Futaba* S148 servo.** With 40 oz.-in. of torque and a 0.22-second transit time, the inexpensive S148 is plenty good for sedan use.

■ **LRP's* new ICS speed control** (see our review in this issue).

■ **Reedy Modifieds* new Tri-Sonic "Y" motor**—a wild 'n' woolly 10-turn triple wind especially for touring cars.

■ **Team Orion* V-Max 1700mAh SCRC pack.**

■ **HPI's own Honda Accord body,** replete with nifty HPI paint job just like the car featured in their ads (included).

PERFORMANCE

If you ask a normal person what they like about their workplace, they might say they appreciate the 401(k) plan, the vacation policy, or maybe the pleasant environment. Me? I like our building's freshly paved, deep-black, feels-like-200-grit-sandpaper parking lot. We are talking *trak-shun!* Believe me, I had a hard time concentrating on work knowing that the RS4 Pro in my trunk was coming out to play at five o'clock. Well, five o'clock did come, and the RS4 Pro hit the ground running. After a short rollout to get the steering trimmed, I went for the big squeeze, and the LRP ICS control dumped a full load of electrons into that 10-turn chunk of insanity from Associated. The RS4 Pro shot up to speed with barely a sound—the dual-belt setup

is whisper-quiet. The parking lot that seemed so spacious a moment earlier felt very small as the RS4 Pro gobbled up yardage. I braked hard and spun the RS4 Pro around its locked rear wheels; with a one-way pulley driving the front belt, you only have rear brakes to stop you. For that small liability, the one-way delivers huge handling advantages. I was able to pitch the Pro into turns sideways well beyond the limits of recoverability for other 4WD cars. Where other cars would be hopelessly unable to transition back to straight running without looping, the RS4 Pro was snapped into shape by the front end of the car as I got back on the gas. As long as the front wheels were pointed in the right direction, I could count on the rest of the car to follow suit. When driving less aggressively, the RS4 Pro had the slightest push, which gave me more confidence than a ragged-edge setup. Top speeds with the Tri-Sonic motor were breathtaking, and the ICS speed control handled the heavy horsepower with ease (look for a Product Watch on this silky-smooth ESC in this issue). The only trouble I encountered with the RS4 Pro was a nearly "lunched" rear belt due to a pebble that got trapped in the diff pulley despite HPI's design precautions. To avoid wrecking your drive train with an RS4 or any other belt-drive car, avoid the "marble" sections of the track and stop immediately if the driveline seems to be locked or if it's skipping.

FINAL THOUGHTS

This is a spectacular car. How's that for succinct? First of all, the thing is loaded; graphite everywhere, ball bearings, ball diffs, dual belts, aluminum shocks, front one-way, belted tires—in short, everything you need to humiliate your friends next Sunday. Second, all that good stuff makes for a dream-car driving experience at the track. Third, the RS4 Pro is readily available with plenty of parts support, and it accepts standard spur gears and the ubiquitous hex-mount wheels. Best of all? The RS4 Pro takes a much smaller bite out of your wallet than the fully optioned original car! For the cost of a fiberglass chassis, standard RS4 with a bearing kit, you can get the all-graphite, full bearings, dual-belt Pro car with a body. Maybe HPI's pricing was a colossal typo, so you should pick up an RS4 Pro before they fix it! Even if the RS4 Pro were pricier, it would still top my list of butt-kicking sedans. This car will rule forever. Hmmm ... I just had the feeling that I've said that before

*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

thrash TEST

1/8 scale gas



THUNDER TIGER **Mirage Vspec**

by Greg Vogel

YOU REALLY have to give a hand to the staff of Thunder Tiger*. They just don't stop, they won't quit, and like their cars, they'll never slow down. Within the last year or so, they have rubbed fenders with top contenders in the 1/10-scale gas truck class and made it possible for anyone to feel the adrenaline rush in 1/8-scale competition. Now they have hit the market with a new 1/8-scale buggy. Who can take any more of all this excitement?

A while back, we reviewed Thunder Tiger's Mirage Pro 1/8-scale off-road buggy. Since then, Thunder Tiger has done some serious homework and has come out with a revamped edition of the Mirage—the Mirage Vspec. Thunder Tiger cars are becoming more popular in all segments of the R/C market, and it's no wonder, because they offer high-quality products at very affordable prices. This philosophy is evident in the new Vspec.



PHOTOS BY JOHN HOWELL AND GREG VOGEL



*Taiwan's Tiger lowers the
cost of **high performance***

MIRAGE VSPEC

THE KIT

To get you the latest updates on new cars and trucks, the editors of *Radio Control Car Action* constantly nag manufacturers to send them cars for review as soon as possible. This time, they were able to nab Thunder Tiger's display model of the new Vspec (production models weren't available). Well, I gave the editors a little taste of their own medicine by nabbing the new Vspec from their clutches.

Take a really good look at the pictures; I couldn't see many changes from the Mirage Pro. The car is still decked out in styling blue-anodized parts like the radio tray, shocks, towers, braces and the countersunk chassis with new kick-up for improved handling. The towers are new. Thunder Tiger got rid of the old tower with which you used the "eeny, meeny, miney, mo, I pick this hole" method to pick a shock location, and they reduced the number of holes to just a few that will affect the car the most. The smooth operating shocks have a rubber boot that extends the length of the shock shaft to keep the dirt away. Plastic spring preload spacers ensure equal shock adjustment on both sides of the car. The newly designed suspension arms can best be

Check out the sleek profile of Thunder Tiger's New Mirage Vspec. From a ground view, this buggy is stylin'! Besides tearing up the dirt in your backyard, the new Y-pattern tires also work well in loose-dirt race conditions.



summed up with one word: "beefy." The arms' long travel and strength take the Vspec from backyard thrasher to competition smasher. The upper camber links have shiny, steel, turnbuckle tie rods for easy adjustments. In the front, universal drive shafts pass through ball bearings in the aluminum hub carriers. Large hex hubs are pinned to prevent the hub from slipping on the axle, and quick-change nuts hold the tires on. In addition, included front and rear swaybars help to keep the chassis nice and flat during cornering. Also worth noting on the suspension are the screw pins that hold on the suspension components. A locknut is threaded on the back of the pin. It's easier to maintain



Likes

- Front kick-up.
- Full ball bearings.
- Lots of blue-anodized parts.
- Tuned pipe.
- Aluminum differential housings.
- Steel main gear, bevel gears and fan-cooling clutch bell.
- Strong suspension parts.
- Price.



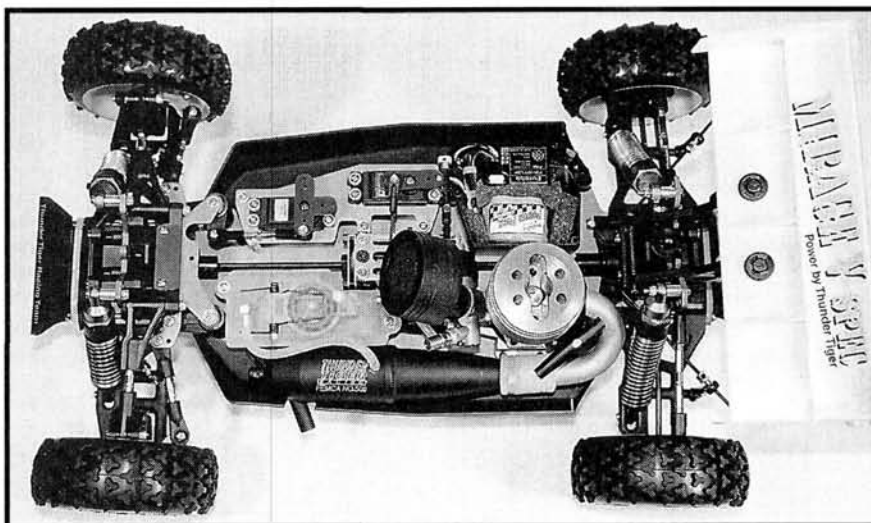
Dislikes

- Steering bellcrank clearance problems.

Building & Setup Tips

Thunder Tiger has really done an excellent job on the new Mirage Vspec. The buggy I received had already been assembled, so I can give only a few tips on building the car. But you shouldn't have any problems if the instructions are anything like the Mirage Pro's; they were excellent.

- I rebuilt the car using Loctite, but unfortunately, I overlooked using it on the setscrew in the universal axles. Guess what loosened up in less than 5 minutes? This shows how important this extra precautionary step is.
- Use a long piece of fuel tubing for the fuel pick-up line. I ran a piece from the tank around the bottom of the air filter once and then to the carburetor nipple.
- When I rebuilt the shocks, I put a little RCPS® Green Slime lubricant on the end of the shafts before I reinserted them. I rebuilt the shocks using 30WT Losi® oil in the rear and 25WT Losi in the front.
- You might want to consider purchasing a large servo-saver for the steering. The supplied horn is too short for maximum steering throw.
- Ride height can affect the car's steering and jumping. I ran the Vspec with the rear axles slightly below level, then dropped the front of the car a little more than the rear.
- Pack the receiver case with foam. This will help prevent the electronics from being bounced around and causing glitches.



An overview shows all the goodies that take this off-road buggy into the racing category: new suspension arms, many aluminum parts, adjustable tie rods and even dirt shields.

THINGS YOU'LL NEED

- 2-channel radio system with receiver. I recommend buying a radio with good servos that have higher torque than standard servos. A receiver battery pack is also necessary.
- Fuel and glow-starter.
- Paint for the body.
- You've read it a million times, and here's the million and first: use Loctite on

screws that make contact with metal parts because vibrations will loosen them. Also for the million and first time, use Green Slime lubricant on the shock O-rings.

■ Other recommendations but not necessities: fuel filter, foam for receiver box, longer fuel line for engine feed and throttle return spring

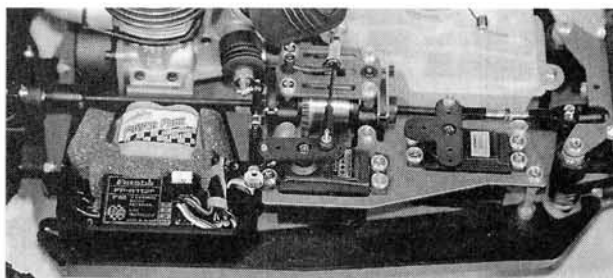
MIRAGE VSPEC

than E-clips that can pop off and ricochet across the room.

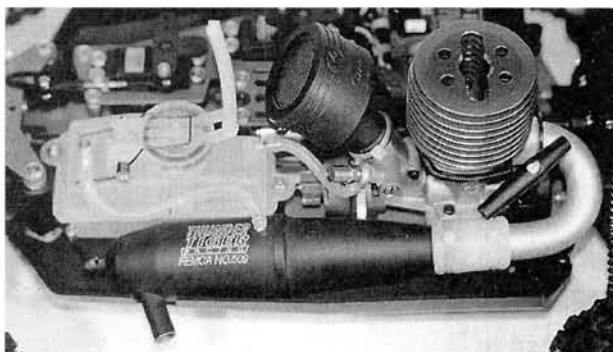
The new transmission is as amazing as the old one. I don't understand how Thunder Tiger can include aluminum differential cases and still keep the car's cost so low. The three low-profile differentials have smooth internal planetary gears and hardened-steel bevel gears in the front and rear. They are mounted in easily accessible differential cases. The whole drive train rides on smooth ball bearings. The center diff with narrow steel spur is driven from a clutch bell that is slotted for cooling. The power is transferred through dogbones to the front and rear. To slow the car, a disk-brake system allows you to adjust both front and rear braking.

You'll still find a strong bellcrank steering system with a spring-loaded servo-saver on one side. An aluminum drag link bar prevents flexing as the car bolts through corners. The steering tie rods, too, are adjustable steel with heavy-duty ball ends. A new brace between the bulkhead and the steering posts adds support. Unfortunately, Thunder Tiger still has not added braces to reduce flex between the radio tray and steering and the radio box and rear transmission case. I'm curious to see whether the chassis will bend during a high-speed endo or crash.

"Thunder Tiger" is an appropriate name for the engines they produce: they are wildly fast beasts. The Pro .21B-R(P) mounted in the car enhances the ensemble with a blue-anodized heat-sink head. The CNC construction, along with the true ABC piston and sleeve, is as perfect as it can be. The other engine features are a



The Mirage Vspec's electronics layout is similar to the Mirage Pro's in that the receiver and battery pack fit nicely into a sealed radio box. The servo tray in conjunction with the box stiffens the center of the chassis.



The Thunder Tiger .21B-R(P) proved to be a powerful engine, even with a pull-starter, and—get this—the aluminum manifold and tuned pipe are standard equipment. Check out the new air filter. The one-piece, offset, dual-stage design is much nicer than the multiple-piece air filter.

slide carb with tight needle valves to prevent air leaks and a heavy-duty pull-starter Tiger ditched the paper filter and came up with a new rubber one with built-in offset to fit better under the body. An aluminum header passes the exhaust to the included aluminum tuned pipe. A 125cc fuel tank provides long run times, and a flip-top lid allows quick fills during races.

On the sides of the chassis are plastic dirt shields that help keep out all the dirt that's kicked up by the four-wheeling tires. The body's tight fit over the shields definitely minimizes dirt intake. The bi-level wing is pretty trick, too. Its second level is underneath the main level, and the side dams are shaped in an arc in the

front so that the rear tires do not hit them. Now I'm all up on ideas for new tire styles, and the tires mounted on the new multi-spoke rims are definitely unique. The pattern reminds me of the clover-shape marshmallows in the cereal I had for break-

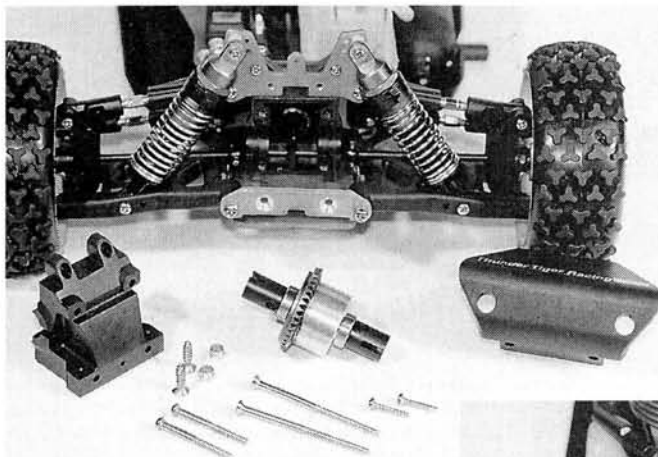
fast. I hope the wacky design will work as well as the cereal tasted.

TEST GEAR

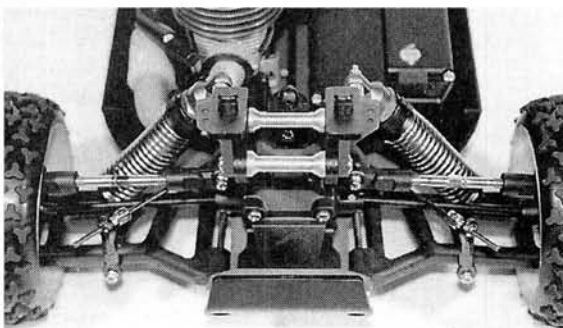
For an 1/8-scale gas car, I recommend an FM radio. Just think: these cars go at incredible speeds, so having an FM radio that is less susceptible to interference should make you feel much better when you drive it. I bought a brand-new Futaba* 3PDF FM radio to install in the buggy. I opted for a Futaba 9304 servo to handle the throttle and brake and an Airtronics* 94151 servo for its speed and torque on the steering. A Dynamite* Blue Thunder 5-cell hump pack fit nicely in the radio box with the Futaba R113F receiver. I packed the radio box with foam so that the electronics wouldn't vibrate like a cheap massage chair. I used Dynamite 20 percent fuel to provide the burn in the powerplant.

PERFORMANCE

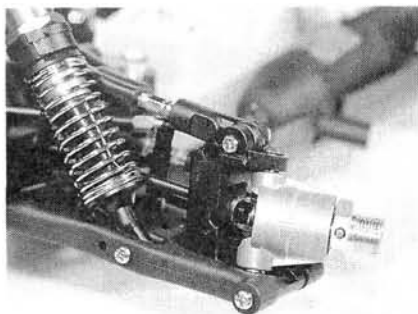
Before you can amuse yourself with the mind-altering abilities of the new Vspec, you have to break in the engine. It can be a long, arduous process, but if it's done correctly, your engine will have a long and powerful life. I always run two tanks of fuel at just an idle and blip the throttle every quarter of a tank. For the third



Disassembly of the differential cases is easy, so differential maintenance is easy, too. As you can see, the differential itself has an aluminum case and a low-profile steel bevel gear. The number of front shock locations on the shock tower has been reduced to four—the four that affect the car most.



Your competition will have to check out the Vspec from behind. The new, wide, heavy-duty suspension arms and shock tower let the buggy float over the bumps and take off over the jumps. The oil-filled blue aluminum shocks and swaybar keep the buggy firmly planted on the ground.



Now that you're in a trance from seeing the strong aluminum hub carrier, I'll let you know that the universal spins on smooth ball bearings like the rest of the transmission. The hex hub is pinned to the drive axle and can accept rims from many other companies.

through fifth tanks, I never go over half throttle. After the fifth tank, I just go wild and see what the car can do.

To see how the car would perform, I

pits, I discovered that the supplied steering horn was a little short, and this caused the ball link to hit the servo. I installed a large Kimbrough* servo-saver to move the link out. The other problem I had was that the bellcrank hit the drag link. I noticed that it created about a 1/16-inch loss of travel. Something this small is relatively insignificant and shouldn't really affect the performance on the track. I returned to the track for the heats and still noticed a push in the car. I also switched tires to some X-pin spike tires that I stole from my OFNA buggy. The bolting pattern was the same, and this provides a larger selection of rims and tires. The original tires worked well on the moist track, but as the day went on and the track dried out, my rear traction faded as well. The car was very close to being hooked up. I still noticed push as I entered the turns, but the traction was excellent coming out, so I was really able to lay the power down.

In the mains, I proved to the racers and spectators that Thunder Tiger's 1/8-scale

the Competition	OFNA Ultra Worlds GT	Mugen Super Athlete	Kyosho MP-5	Thunder Tiger Mirage Vspec
Wheelbase	12.9 in.	12.68 in.	12.625 in.	12.5 in.
Width (F/R)	12.12 in.	9.92 in.	11.875 in.	12.4/12.5 in.
Weight	7 lb., 8 oz.	7 lb., 4 oz.	7 lb., 2 oz.	7 lb., 12 oz.
Diff type	Planetary	Planetary	Mitre	Planetary
Brakes	Dual disk	Dual disk	Dual disk	Dual disk
Exhaust	Header and pipe	Tuned pipe	Not included	Header and pipe
Price	\$535.95	\$749.99	\$699.99	\$559.99
Available at*	\$329	\$500	\$549.99	\$420.20
Issue reviewed	8/97	7/97	12/95	9/97

*Prices vary with location

headed to my favorite race venue, R/C Madness in Enfield, CT, where a new track layout had been prepared. I strutted out to the fuel-up area on the side of the track with the engine turned off, and people started wondering whether I had lost my mind and had forgotten to start the car. I put the glow-igniter on the engine and pulled on the pull-cord. It fired right up, but I heard a few remarks from the crowd that went something like, "This is a race-track. Why is he using a pull-starter?" Many people believe that a pull-starter robs the engine of power and that only non-pull-starters should be used in racing. That day, I intended to prove them wrong.

During my practice run, there was no doubt in my mind that this car had some serious racing potential. The stock setup of the suspension components let the buggy slide through the bumps and handle the jumps with authority. The wide track of the new arms made the buggy very stable as I purposely thrashed it sideways through turns and launched erratically off the jumps. Based on my experience, the car's handling is up to the quality of more expensive cars like the Kyosho and Mugen pure competition cars. I did, however, notice a serious push in the car and not enough steering. When I returned to the

buggies shouldn't be taken lightly. I placed third in the A-Main after a long battle in a field of Kyosho and Mugen cars. There was still push in the car, so when I go back next time, I'll lower its front ride height a little, disengage the front swaybar, add 1 degree of toe-out and/or change the Ackerman in the steering.

FINAL THOUGHTS

The world of 1/8-scale off-road gas is known more for its high cost than the buggies themselves. Ask any R/C enthusiast about the class, and his first comment will be, "It's too expensive!" Thunder Tiger's objective here is to change the focus from "expensive" to "excitement," and the 1/8-scale Vspec is where it's at. The new Mirage Vspec is definitely exciting and is an excellent addition to the lineup of competition-quality vehicles that offers backyard fun to boot. The superior handling and inclusion of many options that would normally have to be bought as aftermarket items make this affordable machine a real threat. How could you pass up getting involved in an adrenaline-pumping experience?

*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

DAHM'S RACING BODIES



NEW! TOYMINATOR XXT2™
D245 Light .030 Lexan & D246 Strong .040 Lexan



TOYMINATOR XXT2™ Fits Low & Tight on the Associated RC10T, RC10T2, Losi XXT, XXTCR & Tamiya Stadium Blitzter. 3-D Side Panels Hug the Frame, Spoilers & Headlight, Taillight & Grill Decals.



D236 & D237 CYBER BUGGSY™
Fits RC10T & RC10T2. Features Cool Roof Scoop, Rear Spoiler, Chopped Top, & Headlight & Taillight Decals. D236 Light Lexan, D237 Strong Lexan
D247 & D248 CYBER X BUGGSY™
NEW! Cyber Buggsy for Team Losi XXT & XXTCR. D247 Light .030 Lexan, D248 Strong .040 Lexan



D243 & D244 SPITFIRE XLSS™
Fits RC10LSS & EV10LSS. New Extended Cab Version of SPITFIRE SS - World's Most Aerodynamic SuperTruck Body. D243 Light, D244 Strong
D219 & D220 SPITFIRE SS™
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THE MOST IMPORTANT, AND LEAST EXPENSIVE CHANGE YOU CAN MAKE TO YOUR CAR TO IMPROVE PERFORMANCE AND APPEARANCE, IS TO PUT ON A NEW DAHM'S LEXAN RACING BODY! SEND \$2.00 FOR DAHM'S NEW CATALOG, OR \$4.00 FOR A CATALOG & DECALS TO:

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EIGHTH-SCALE NITRO BUGGIES TERRORIZE LOCAL TRACKS

Action at the start as nitro buggies take to the track. A new breed of affordable buggies makes it easier than ever to enjoy this exciting racing class.

by Frank "Methanol" Masi

I'VE ALWAYS LOVED racing gas off-road—especially $\frac{1}{8}$ -scale buggies. They have more horsepower than you'll ever need, sound like motocross bikes and are built to be as tough as nails. Problem was, I could race my gas buggy only once or maybe twice a year at one of the big Gas Challenge races that R/C Car Action co-sponsors with Kyosho USA*. This infrequent use of one of the most beloved members of my R/C stable was depressing. I would race gas buggies every weekend if I could, but it seems that few tracks offer a class for the big nitro burners.

Then something fantastic happened: a local hobby shop and off-road track had sold over 10, $\frac{1}{8}$ -scale buggy kits during the winter months—easily enough entries for an entire class if they showed up when the weather warmed and the outdoor season began. They showed. And when other racers saw how fast, reliable and exciting the gas buggies were, many of them became involved as well. As a result, the $\frac{1}{8}$ -scale gas buggy class is routinely the largest at this formerly $\frac{1}{10}$ -scale-only track. On Sundays, there are now at least two full heats of nitro buggies.

Gas Off-Road

PHOTOS BY JOHN HOWELL AND FRANK MASI



Budget Buggies: The Affordable Alternative

Once they become more experienced with engine tuning and chassis setup, some racers move on to the more expensive buggies such as the Kyosho MP-5 or the Mugen® Super Athlete. But the questions most frequently asked by potential buggy owners are: "Why are some buggies so much more expensive than others?" "What are you getting for the extra



money?" and "Are the big-buck buggies really worth the additional coin?"

Two things separate an expensive racing buggy from its less expensive competition: the material used to make its parts and the subtle design nuances that become evident during higher levels of competition. By no means does this statement imply that low-cost racing buggies are cheaply made; quite the opposite is true. However, top-line machines are designed to withstand the rigors of world-championship racing, in which durability and performance must be at their peak.

Drivers of average skill will be hard-pressed to tell the difference between one of today's budget buggies and a more expensive counterpart.

Experienced drivers, however, will almost always be faster with a top-line racing machine. Although the cars may appear to be identical, most serious racing buggies are designed and refined through extensive racing and testing by team drivers. Yes, with gas buggies, like most everything else in life, you get what you pay for, but today's crop of less expensive 1/8-scale buggies significantly narrows the gap.



gets
REAL



Above: even the R/C Car Action staff gets to play once in a while. (C'mon, you didn't think we worked all the time, did you? OK ... how about a little? Would you believe ... not much?). Left: Joe Wechter's "Team Fun" MP-5 digs its nose into the ground as it negotiates the dreaded "drop-off berm."

It takes teamwork



Possibly the best thing about gas racing is that it's a collaborative effort; without a competent pit person, even the fastest car hasn't a chance of winning. To be a good pit person you must:

- Pay attention! Watch your driver; he may be trying to signal you from the drivers' stand. Work out a series of hand signals before the race, e.g., a signal for "I need fuel," or "Richen the needle setting."
- Obey all the rules. I've seen many a driver be disqualified because of his pit person's negligence. If there's a pit wall, stay behind it. If your car flames out, don't run out across the track to retrieve it. Most tracks allow the turn marshals to pass the car to the track's outer fence where you may receive it.
- Fuel fast, but carefully. This is important for two reasons. First and foremost, if you fill the tank too quickly and make the fuel foam, you haven't given your driver a full fill, and he may run out of gas! Also, most drivers would rather have you take a few extra seconds to fill the tank slowly than to splash dirt-attracting fuel all over their chassis.

There you have it. Be the second half of a winning team. Be a good pit person!



Left: camaraderie and nitro racing go well together. Racers are always willing to share their speed secrets and to help troubleshoot a competitor's car. Above: gas cars don't need as much support equipment as you may believe. Bring your fuel, starter, glow igniter and radio, and you're set to go. Right: "I'm up!" The racing program provides a 3-minute warmup period prior to the start of any heat or main event.

BETTER BUGGIES AT LOWER PRICES

The driving forces behind this increased participation are the higher quality and performance of entry-level gas-buggy kits. New offerings from companies such as Thunder Tiger* and OFNA* have made it possible for more people to taste the excitement of nitro off-road. These kits offer performance that's on a par with that of the best racing buggies from just a few years back, but they're priced just slightly above what you would pay for a top-shelf 1/10-scale gas racing truck.

For example, you can buy OFNA's new Ultra Worlds GT (see review in the August '97 issue) or Thunder Tiger's Mirage Pro Vspec (reviewed in this issue) with a .21-size glow engine for around \$400. When you consider that an electric racing truck such as the Associated RC10T2 with one battery pack and one modified motor will set you back around \$375, getting involved with gas buggies doesn't seem all that expensive.

Having raced my Kyosho MP-5 against both the OFNA and the Thunder Tiger cars, I can vouch for their performance. I've had many close battles with contributing author Greg Vogel as he raced the so-called "cheap" buggies for his "Thrash Tests," and I've found myself getting a good view of the back of his car on more than one occasion.

THE GAS BUGGY RUSH: DRIVING SENSATIONS

Driving a 1/8-scale gas buggy is an experience quite unlike any other. With so much power at your disposal and the grip and acceleration of 4WD, the urge to just "rip it up" becomes almost irresistible. Here are some simple driving techniques:

- If you're new to nitro buggies, the most important driving tip I can give is to lose the delicate throttle control you've honed through years of racing electric cars and trucks. Gas buggies don't respond to light touches; they like to be thrown around. And the more dirt there is spitting from the tires, the better. "Blipping" the throttle through turns and over difficult obstacles is often the best way to keep the engine's rpm where it will make the most power.

- Almost every aspect of an 1/8-scale buggy's handling stems from the force of its engine. From the way it makes the car slide through turns to its ability to change the car's attitude while in the air, throttle dictates the buggy's every move. As long as you're on the gas, your buggy will be more stable through the bumps. It's usually when you let off the throttle that the car rolls and tumbles. On one occasion, I could not get my car to go through a series of small, closely spaced "stutter" bumps. Even if I crept through

CLUB RACERS GO GAS



Barry Tullai, Derby, CT

No. of years racing R/C cars: 4

No. of years racing 1/8-scale off-road: less than 1

Current car: Mugen Super Athlete

"I've raced 1/10-scale gas trucks, but I wanted something different. I like this [1/8-scale gas] the best. The cars handle better and, for me anyway, are easier to drive compared with 2WD trucks and buggies. I'm a little older than most of the other guys, but I have no trouble seeing this car. For me, the price is negligible. If you wanna do it, do it."

Rich "Shoe Box" Dalton, Easton, MA

No. of years racing R/C cars: 11

No. of years racing 1/8-scale off-road: 3

Current car: Crono

"I had an RC10GT, but when I tried a friend's 1/8 scale, I immediately made the switch. The cars have more power, and it's easier to tune the engine. Basically, I find them more exciting. At first, you'll spend a little more if you're starting with nothing. But once you're going, you'll feel like you have more. Plus you'll have more fun! Budget 1/8 cars are good to get started with, especially the ones that come with an engine and exhaust package. Once you get started, you'll eventually make the switch to a more expensive car."



Owen Morrison, Boston, MA

No. of years racing R/C cars: 9

No. of years racing 1/8-scale off-road: 4

Current car: Kyosho Turbo Inferno

"Initially, the cost of 1/8 scale is higher, but I feel the cars are less expensive to maintain. The power and speed and overall performance beat the electrics. You can't beat the durability and reliability of the 1/8-scale cars. If you take care of your engine, the piston and sleeve will last an entire season. I'd love to see this catch on and spread across the country. I'm sure that the motocross guys didn't start at the top; they built their sport slowly."

Greg Vogel, New Fairfield, CT

No. of years racing R/C cars: 12

No. of years racing 1/8-scale off-road: less than 1

Current car: Thunder Tiger Mirage Vspec

"I've probably raced every type of car imaginable, but after only two months, I'm hooked on 1/8-scale off-road. You don't have to have the most expensive car to be competitive. I've raced both the OFNA Ultra GT and the Thunder Tiger Mirage and have always finished in the top five. I've even won! I'd like to see more clubs around the country add a gas-buggy class. This is the first year that we've had one, and it gets more spectators than any of the other classes."



Joe Wechter, Westfield, MA

No. of years racing R/C cars: 3

No. of years racing 1/8-scale off-road: less than 1

Current car: Kyosho MP-5

"I tried my Dad's car and it ripped through the turns. When my Dad got a new car, he gave me his old MP-5, and I love it. The 10-minute mains they run here are great because you have to come in for a pit stop, and I love the straight-away speed and fighting with the other racers. It's a big war out there!"

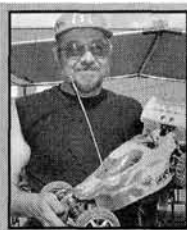
Richard Wechter, Westfield, MA

No. of years racing R/C cars: 3

No. of years racing 1/8-scale off-road: 1

Current car: Kyosho MP-5 Evolution

"I saw 1/8-scale buggies last year and knew I had to get one. I was the first at this track to have a gas buggy, and I let a lot of other people try my car, and now gas is the biggest class here. I like the power of the engines and really enjoy working on the cars because of their size. Of all the cars that race here, the 1/8-scale cars by far take the most abuse, yet almost all of them finish the race consistently. I didn't have to touch my engine all last year. I got through the whole season and had to buy only fuel."



Ernie Maroon, Wolcott, CT

No. of years racing R/C cars: 11

No. of years racing 1/8-scale off-road: 2

Current car: Mugen Super Athlete

"I started out racing gas on-road, but traveling got to be too much, so I switched to electric off-road. But it just didn't seem as exciting. I started off in gas off-road with a Thunder Tiger Mirage. For the money, it's a super car. Overall, the car you buy will depend on your skill level. Better drivers will want the more expensive cars. But for me, the cost of getting into 1/8-scale off-road wasn't high at all. As long as there are people to race, I'll keep coming here."

Meet the Madman

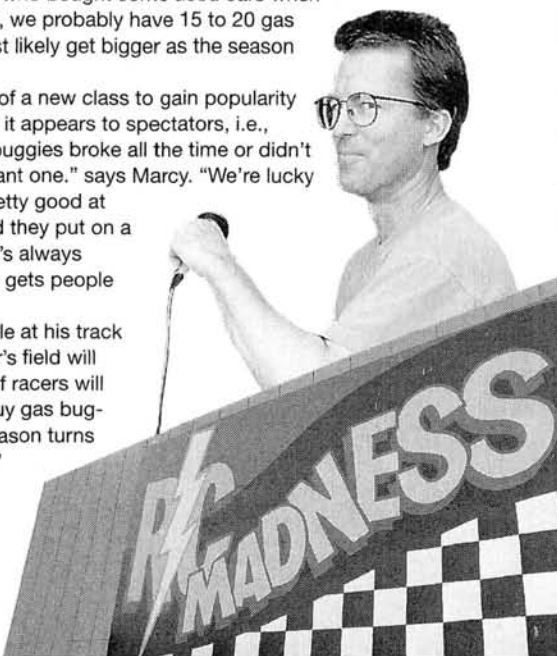
Avid *R/C Car Action* readers will recognize the name "R/C Madness." It's a track in Enfield, CT, about an hour north of our offices, where we perform most of our "Thrash Tests." Track owner Chris Marcy is an enthusiastic racer, and as a result, he knows what racers expect from a track and what will keep them coming back. Chris changes his track layouts monthly, and he's always looking for ways to make the racing more enjoyable. This includes adding new classes to accommodate his customers' interests.

During last year's racing season, R/C Madness hosted one leg of a three-race series for 1/8-scale gas buggies. Over 20 of the big nitro burners showed up, and many of the local racers and spectators—most of whom had never seen gas buggies in action—were impressed enough to buy their own buggies for the following season.

"It always takes time to build a new class," says Marcy. "Last year, we had one 1/8-scale guy who'd run with the gas trucks. This year, between the 10 or so buggies I've sold in my shop and the guys who bought some used cars when the more serious racers upgraded, we probably have 15 to 20 gas buggies, and this number will most likely get bigger as the season progresses."

According to Marcy, the ability of a new class to gain popularity largely depends on how much fun it appears to spectators, i.e., potential racers. "If all of the gas buggies broke all the time or didn't run consistently, nobody would want one," says Marcy. "We're lucky that most of our gas racers are pretty good at keeping their engines running, and they put on a good show of fast, close racing. It's always exciting to watch them. This really gets people stoked."

Marcy doesn't think that 1/8 scale at his track is a fad. He predicts that next year's field will be even larger. "I know that a lot of racers will probably wait until the winter to buy gas buggies; they want to see how this season turns out before making an investment," adds Marcy. "I've even picked up an old Mugen buggy. It'll take some work to get it going, but watch out for me; I'm WFO!"



SAFETY CONSIDERATIONS

If you are a track owner considering the addition of 1/8-scale gas buggies to your roster, bear in mind that gas buggies are much heavier than smaller, electric- and gas-powered 1/10-scale vehicles, and they travel at far greater speeds. Because of this, the safety of your participants as well as your spectators must be your prime concern. Here are some suggestions to help keep your track a safe place.

■ If possible, border your track with a 6-foot-high fence—the stouter, the better. Chain-link provides good protection and provides spectators with clear viewing. At the very least, add fencing between your track and any area in which bystanders may gather; this includes the pit area. If fencing is out of the question, be sure to keep spectators at least 25 feet from the track when the 1/8-scale buggies are running.

■ Allow only experienced adults to turn-marshall during 1/8-scale events. And insist that they wear adequate foot protection (no bare feet or sandals!). Also, it's a good idea to supply thick gardening gloves for your marshals to prevent them from being cut or burned when handling gas buggies.

■ Enforce a "down and quiet" starting procedure. This means that before the flag drops, no car may be held by a pit person. This will minimize the possibility of injuries caused by flying debris from a spinning tire and is the type of procedure used by all sanctioning organizations. If a car doesn't idle at a standstill, it must be started from the back, or at a later time.

■ Make sure that the 1/8-scale drivers understand that they are responsible for their potentially dangerous machines. They must not apply any throttle when their cars are being marshalled; reprimand any driver who shows little regard for the safety of turn marshals or pit persons. Throw him out if you have to; you don't want the liability! Eighth scale can be an exciting form of racing, but it's very serious business. Keep safety a prime concern and you'll have a successful program.

at a snail's pace, the front end would dig in and send the car over onto its roof. I then learned that by going through the bumps at nearly full throttle, the car would "skip" over their tops, while the rotating force of the tires countered any chance of the car doing an "endo."

Use the throttle to manipulate the car while it jumps. Increasing the engine's rpm while the car is in flight will raise its front end. Stabbing the brakes will lower the front end. Turning the wheels to the right while adding throttle will tilt the car to the left. Turning to the left will tilt the car to the right.

• I have two sets of wheels and tires for my MP-5: one set of soft, high-grip mini-pin tires and the original set of X-pattern, hard-compound tires that came with the kit (these don't even have foam inserts). The soft tires provide awesome traction, but when the track gets bumpy, I use the harder tires. Why? The soft tires grip so much that they tend to snag the edges of bumps and holes and send the car off in a wild traction-roll. The hard-compound tires slide over and around the bumps, so the car is more stable.

Additionally, I'll use the harder tires when the track is smaller and has lots of tight corners. In most cases, the quickest way to negotiate a tight turn is to simply slide the car through. Sometimes, I'll even give the steering wheel a little flick in the opposite direction before yanking it in the direction of the turn. This begins the slide and helps "kick" the rear of the car around, which enables you to get back on the throttle sooner.

HOW TO GET STARTED

If you or your friends own 1/8-scale buggies and are frustrated because you have nowhere to race, show this article to your local off-road track owner (outdoor tracks, of course). Explain how, with just a few common-sense safety precautions (explained in the "Safety Considerations" sidebar), he could add a class for gas buggies that may possibly increase overall race attendance.

One thing's for sure: if you like off-road, you owe it to yourself to check out 1/8-scale buggies. Never before have they been this affordable and easy to maintain. I know I'm hooked, and I'll be racing my buggy this season until its wheels fall off. Knowing how durable they are, this could take a long time!

*Addresses are listed alphabetically in the Index of Manufacturers on page 200. ■

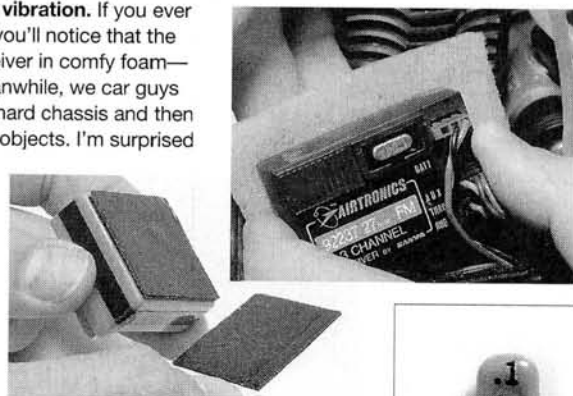
10 Ways to Stop Radio Glitching

Tips and tricks to keep your car on track

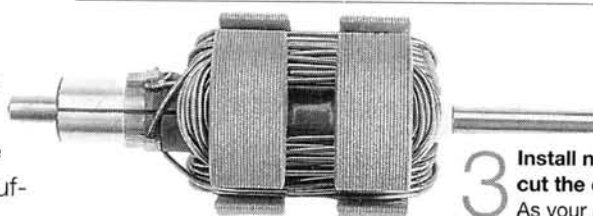
by Peter Vieira

AN R/C CAR can be loads of fun, but it can also do plenty of things to frustrate you. Want proof? Just take a look at the "Troubleshooting" column every month. There's always some hapless soul with a slipping diff, leaky shocks, a balky pull-starter, stripped gears, or any of a thousand other maladyes. But of all the things that can go wrong in R/C-dom, for sheer aggravation, nothing tops the dreaded glitch. When your car won't respond to your commands or it makes up its own, radio control becomes "radio-no-control." And unlike those problems that you can see, the glitch gremlin is tough to spot. Believe me, wrestling with a nasty glitch can soon have you checking out the Rogaine display at the drugstore. But there is a bright side; thanks to my suffering at the prickly hands of many glitch situations (glitchuations?), I've come up with 10 ways to put you back in control of your ride without ending up looking like Telly Savalas (or Capt. Picard, if you don't remember Kojak). Take command!

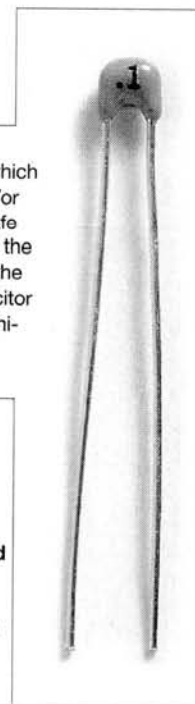
1 Isolate the receiver from vibration. If you ever look inside an R/C plane, you'll notice that the flier has swaddled his receiver in comfy foam—just to float around the sky! Meanwhile, we car guys are just taping the receiver to a hard chassis and then slamming the car into immobile objects. I'm surprised receivers last a single race! To keep that signal coming in loud and clear, glue a piece of foam rubber to the receiver as a mounting pad. Even if you don't currently have a glitch problem, this is a good preventive measure.



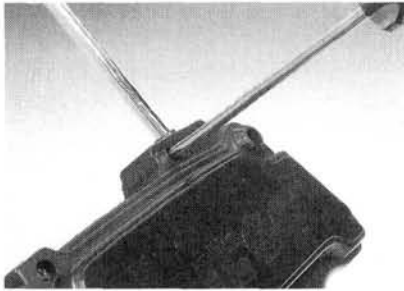
2 Install motor capacitors. This is a must! If you are uncertain as to which capacitors you need to use, refer to your ESC's owner's manual and/or your car's manual. If you lost/threw away/dog ate your manuals, a safe bet is to install a 0.1-microfarad 50V capacitor from the positive terminal to the motor can, another from the negative terminal to the can, and a third from the negative to the positive terminals. [Warning: be careful not to pile the capacitor leads on top of one another so that they form a short across the motor terminals.] If this doesn't fix your problem, well, there are eight tips to go



3 Install new brushes and cut the commutator. As your motor turns, the brushes inside it are constantly rubbing against the comm to make it spin. With each run, the brushes get shorter and the commutator gets rougher. This causes the brush to arc, or spark, as it tries to maintain contact with the comm. Each spark represents a veritable storm of interference for your radio. If your motor puts on a fireworks display when you blip the throttle, there's a good chance that it is the source of your glitch problem. To solve it, first "cut," or true the comm. To be done properly, this requires a special lathe. Your local hobby shop should be able to help you, or at least steer you toward a racer with a lathe. Once the comm has been cut, install new brushes for renewed motor performance and, hopefully, no more glitches.

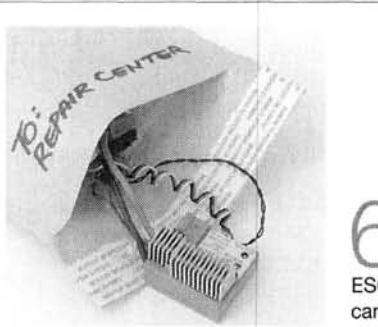


PHOTOS BY WALTER SUDAS AND PETER VIEIRA

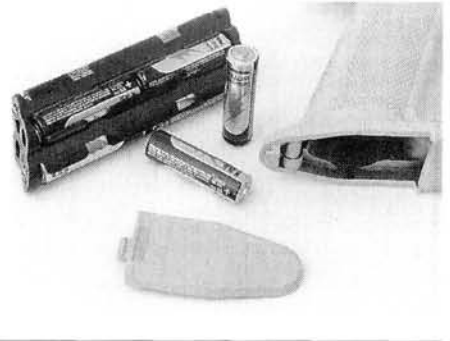


4 Re-tune your radio and receiver. This is not a do-it-yourself operation, nor is it a let-your-buddy-do-it operation. Pack up your gear (I hope you saved that nice Styrofoam container it came in) and return it to the manufacturer. They will recalibrate the receiver and transmitter to like-new specs. This operation may even be performed under warranty (I always send in the warranty card on my radios; I encourage you to do the same). Even if the warranty has long expired, don't fret; recalibration isn't expensive, and it sure beats buying a new system.

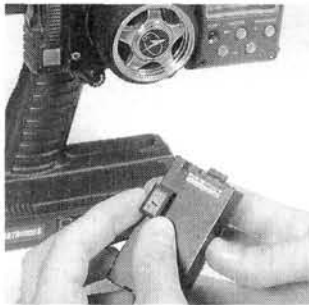
5 Install fresh transmitter batteries. Did I just hear a collective Homer Simpson "Doh!" from readerland? Check those batteries! If I just saved you from looking like a schmelnick at the hobby shop, you owe me a dollar.



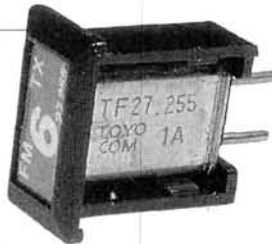
receiver enough juice to do its job properly, and this results in a case of the glitches. Once again, this is a send-it-back issue. I've had to do this myself, and the cost is generally very reasonable. Some manufacturers will even sell you a new ESC for a decent price if the cost to repair the faulty unit is prohibitive.



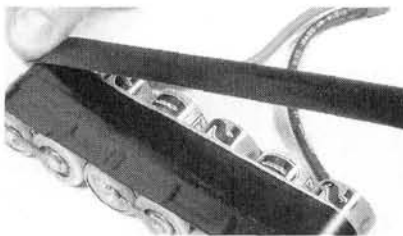
6 Have your speed control serviced. What you're looking for here is a problem with the BEC, or battery eliminator circuitry. This is the part of your ESC that sends current to the receiver. The receiver can't handle 7.2 volts, so the BEC brings the voltage down to 5.6 volts. Sometimes, the BEC fails to give the



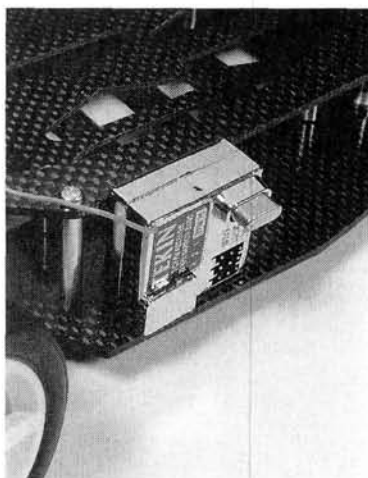
7 Replace receiver and transmitter crystals. Crystals are literally that: crystal. Inside that pronged metal pill is a thin flake of mineral that oscillates at a certain rate, or frequency. Damage that flake and your radio system will stop working or work very poorly. If your glitch problems began after a crash or after you dropped your radio, the crystals are the likely culprits. Replace 'em.



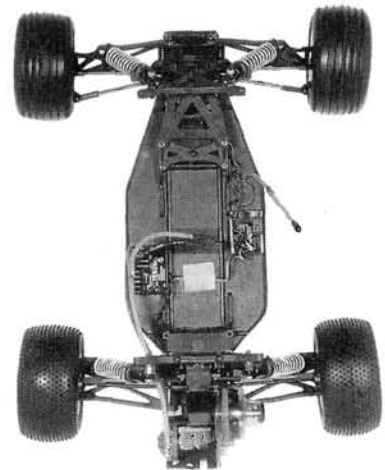
8 Re-route motor and battery wires. The power wires for the battery and motor contain lots of energy, and if they're not routed properly, they can easily interfere with signal reception. This isn't difficult; just keep the wires reasonably short and try to route the battery and motor wires as far from the receiver as possible. While you're at it, check all solder joints, spade connectors, bullet connectors and battery plugs for proper insulation and tightness.



9 Insulate the battery from the chassis. Battery shorts can really wreak havoc with your radio. Graphite pan cars are very susceptible to this type of glitch. What usually happens is that the constant rubbing of the batteries against the hard graphite chassis causes the batteries' plastic covering to wear through and short against the conductive graphite, causing excessive radio noise. To remedy this, wrap the chassis' battery slots with electrical tape. Look over your packs for breaks in the shrink-wrap and re-shrink if necessary. If you're sliding side-by-side packs into a car with a double-deck graphite chassis, take care not to short the pack against the aluminum top plate supports. Wrap the supports with electrical tape or slide on some heat-shrink tubing during your next rebuild.



10 Reposition the receiver. To improve reception, some manufacturers recommend that you mount the receiver on its side with the antenna off the chassis. This is a good tip for any receiver, regardless of brand. Repositioning the receiver along with a foam (or similar "soft" mount) pad can go a long way toward eliminating a persistent glitch.



Whew! Your glitch problems should now be history. If you're still stuck, let your local shop give your radio the once-over. Ask around at the track, too; if anyone is going to have experience with glitching, it's racers. Most will be happy to help you out; just don't ask them the best way to peak a battery, or you'll be there for hours. ■



5th Annual

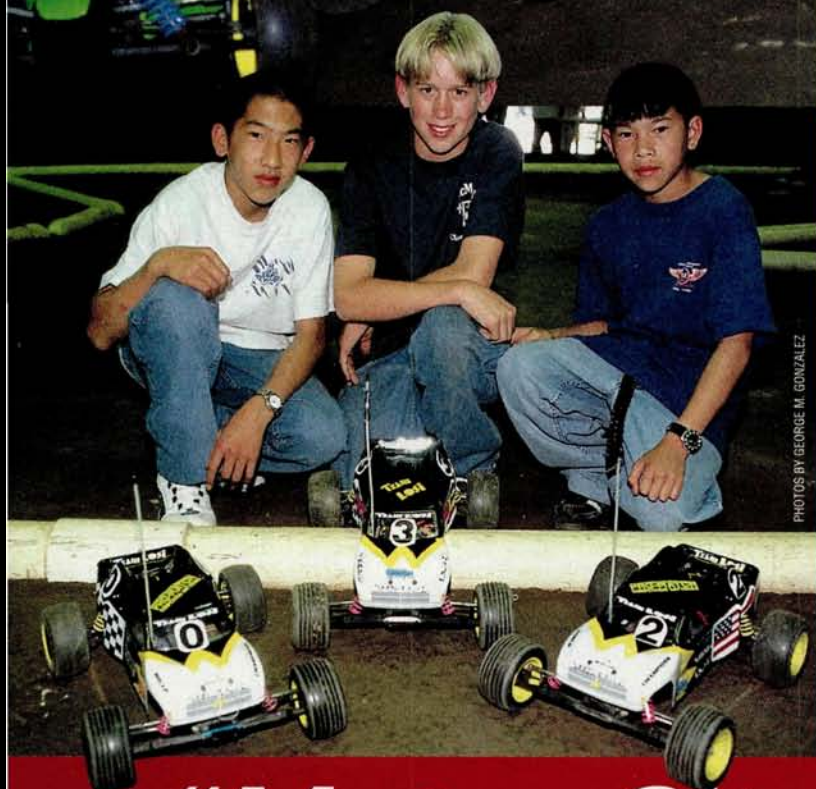
Motor Man

Challenge

by George M. Gonzalez

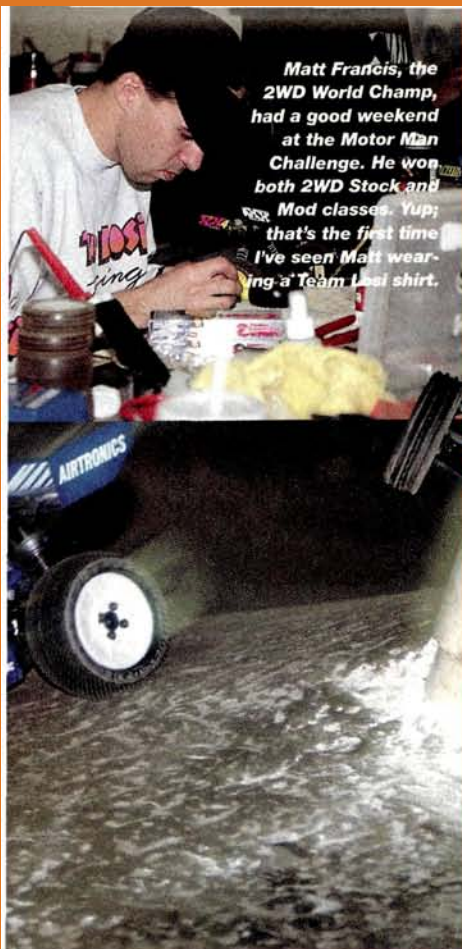
WHEN THE FIRST Motor Man Challenge was contested back in '93, it was considered a club race. Now in its fifth year and held at Sacramento's premier racing facility, Hobby Warehouse, it's still a club race, but it's one of the largest in the country. It isn't a sanctioned event, but more than 250 talented racers show up every year to battle against 2WD world champ and Team Losi factory driver, Matt Francis and his brother Mark (also an incredibly talented driver who races for Team Associated), who happen to be regulars at the Hobby Warehouse racing facility. Talk about sibling rivalry!

Left: Concours consolation prize winners (left to right): Landon Yee, Jadon Darying and Lucas Yee. Matching rides—cool.



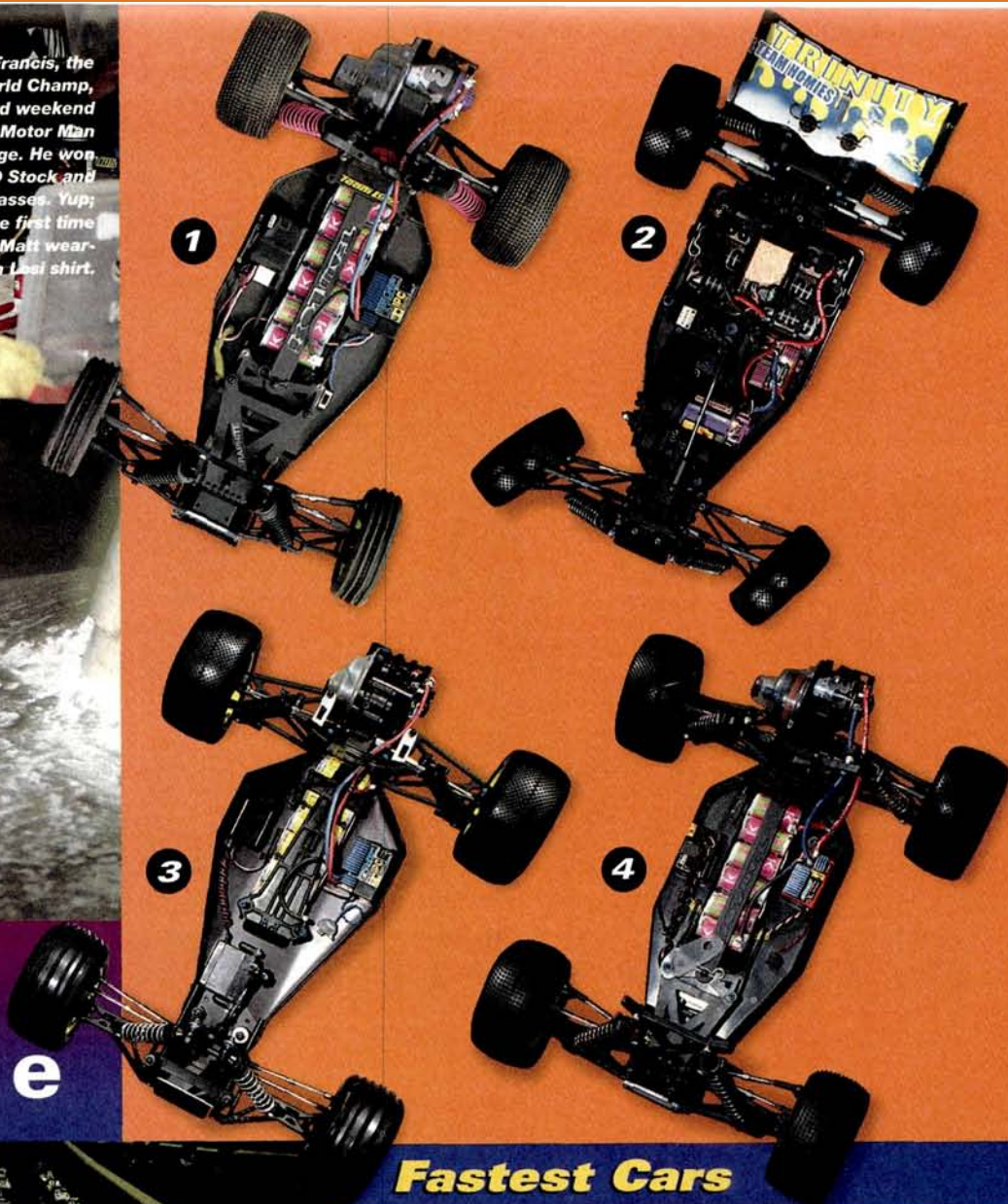
PHOTOS BY GEORGE M. GONZALEZ

"Motor City" Madness



Matt Francis, the 2WD World Champ, had a good weekend at the Motor Man Challenge. He won both 2WD Stock and Mod classes. Yup; that's the first time I've seen Matt wearing a Team Losi shirt.

n g e

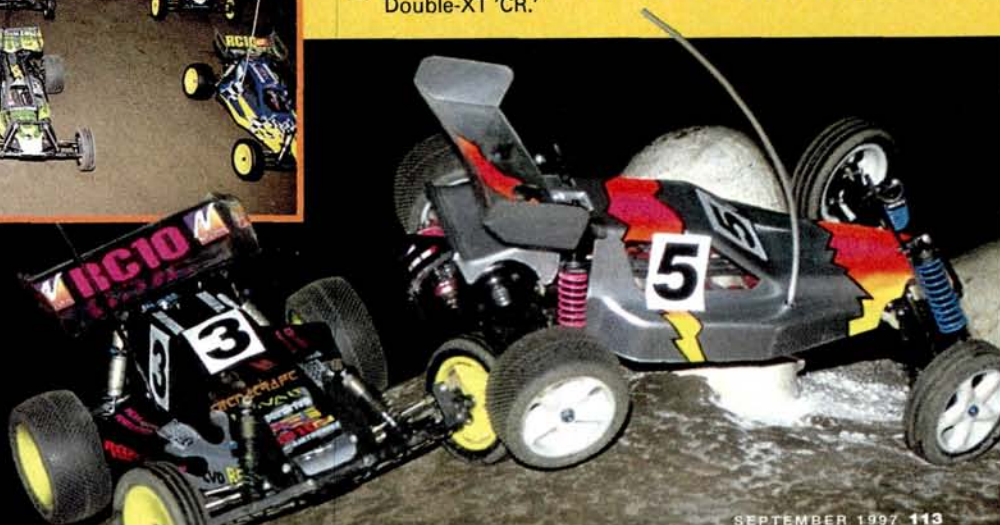


Fastest Cars

- 1 Matt Francis's 2WD Stock and Mod top-qualifying Team Losi Double-X 'CR.'
- 2 Brian Kinwald's 4WD top-qualifying Team Losi Double-X4.
- 3 Jimmy Jacobson's Stock Truck top-qualifying RC10T2.
- 4 Gabe Boudreau's Mod Truck top-qualifying Team Losi Double-X4 'CR.'



Lining up for the concours event. More than 100 cars and trucks were entered.



MOTOR MAN CHALLENGE

The Francis brothers weren't the only R/C celebrities who competed this year; Team Trinity/Team Losi factory driver Brian Kinwald, Team Maxtec driver Barry Baker and Team Associated factory drivers Jimmy Jacobson and Scott Hughes all made the trek to the track for the three-day event.

SCHEDULE

The five classes included 2WD Stock and Modified, Truck Stock and Modified and 4WD Modified. Four rounds of qualifying

gave the drivers plenty of opportunities to put in a good run. The top 10 finalists in each class then faced triple A-Mains, while all the other drivers faced a single decisive Main.

Bad weather plagued a couple of previous Motor Man Challenges, but this year, racers enjoyed sun and cool breezes that brought the temperature to a comfortable 75 degrees. Friday was reserved for open practice and turned out to be very busy with drivers wrenching and practicing to find the perfect setup. The relaxed atmosphere allowed the pro drivers plenty of

time to coach inexperienced racers and help them with their setups. Brian Kinwald constantly had a crowd around his pit table, and he never once turned away from anyone; no doubt, Brian has a big heart and remembers what it was like when he first started.

Saturday brought the first three rounds of qualifying and turned out to be a very long day that lasted until after 11 p.m. The fourth and final qualifier started at 10 a.m. on Sunday, and by 1:30 p.m., all qualifying had been completed. Concours followed, and at 2:30 p.m., the Mains were posted and the crowd had started to arrive.

CONCOURS

When track owner Roger Hubbard asked me to be one of the concours judges, I immediately replied, "No sweat." But when the cars started to line up, I was

The staff and loyal customers of Jake's Performance Hobbies of Rohnert Park, CA. These guys are regulars at the Motor Man Challenge. From left to right: Wayne Stolhand, Joe Raykovich, Cameron Stolhand, James Weatherston, Adam Anderson, "Skittles," Henry Jensen and Harry Salas.



NITRO'S HOTTEST SHOWROOM



When you want to browse around gas racing's hottest showroom, start up your internet browser. Log onto the Team Serpent Network web site and find out how the Power-Start starting box effortlessly fires up a gas car or truck. Learn why ROAR champs and the Worlds T.Q. choose Mega engines. See which Impact-2 features make it such a 1/10-scale racing force. Or discover why the Vector is simply the most advanced R/C car ever made. If you're into gas, get into TSN - Because the keys to unlock nitro's hottest showroom are at your fingertips.

E-mail: Serpent USA, Inc.: serp-usa@ix.netcom.com Serpent b.v., The Netherlands: team@serpent.nl



The Orange Dog Racing Team—more regulars of the Motor Man Challenge. Back row (left to right): Brian Strange, Eric Zimmerman and Robert Ely. Front row: Ray Mock, Komo (dog on left), Iris Aromin, Mouse (dog on right) and Ben Aromin.

the only one sweating! Seeing a parade of more than 100 cars and trucks, I realized that picking just three wouldn't be an easy task, but after much deliberation, we had chosen the winners.

- First (plaque and a two-year subscription to *R/C Car Action*)—Rick Lund, for his outrageous-looking Associated RC10T2.
- Second (plaque and one-year subscription)—Team Orange Dog member Ben Aromin, for his wild Team Losi Double-X 'CR.'
- Third (plaque and a 6-month sub)—PK Wolf, for his Associated RC10B2.

Healthful Pit Tip from Hobby Warehouse

As I was strolling among the pit tables, I noticed two things: there was no awful smell of tire-traction additives; and many contestants toted large, resealable plastic bags that contained complete sets of off-road tires.

I later found out that Hobby Warehouse employees had recommended that contestants try a new tire-conditioning method. I also noticed that many drivers went outside to clean their motors with motor spray. As you probably know, these sprays give off fumes that can be harmful over time if inhaled. Although the drivers hadn't been asked to spray outside, they had decided to take the extra step to keep the facility environmentally sound.

As for the bags, conditioning your tires in a resealable plastic bag actually makes them softer than if you apply the solution directly to them and then let it dry immediately. Here's how to do it: put your tires into a zip-top bag and close it about two-thirds of the way. Spray traction additive into the bag through the opening, then finish sealing it. Some drivers let their tires sit in the sealed bag for a few minutes; others leave them for several hours. Whatever your preference, this conditioning method minimizes fumes. Give it a try; your lungs will thank you.



Keep the fumes under control—a smart pit tip to practice.

AND YOU'VE GOT THE KEYS.



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Serpent
EXCITEMENT IN THE FAST LANE

MOTOR MAN CHALLENGE



Above: one of the pit areas. The Hobby Warehouse facility can easily accommodate hundreds of racers; the ones who don't fit can pit outside.

Right: Team Losi driver Alex Guerrero tweaks his motor. Alex had a lot of close calls, but no cigars were handed out at this race (hey, anyone can have an "off" weekend!).



I also chose three consolation prize winners who had painted their Team Losi Double-XT 'CR's to match (don't you just love those theme racers?). Landon Yee, Lucas Yee and Jardon Darying each took home a 6-month subscription for their efforts. I was glad they didn't all race in the same heat—would have been pretty confusing.

QUALIFYING

After four grueling rounds:

- **2WD Stock:** Matt Francis had his brand-new Losi Double-X 'CR' dialed to perfection and beat out Bryce Beaver and Jimmy Jacobson, who drove Associated RC10B2s.
- **2WD Mod:** Matt Francis took the lime-light once again, but he had to battle his

brother Mark's RC10B2 to earn the TQ honors.

- **Truck Stock:** Jimmy Jacobson had to deal with Brad Nibbelink and Chris Schoppe, but his clean driving paid off.
- **Truck Mod:** Gabe Boudreau dominated, but he constantly had to shake off Mark Francis and Scott Hughes. His efforts were rewarded when he got the word that he would be the pole-sitter at the start of the A-Main.
- **4WD Mod:** Brian Kinwald TQ'd, but it didn't come easy; Matt Francis was tough to beat, and there was no doubt that Brian had some tough competition on his hands. (The IFMAR World Championships should prove to be very interesting this year.)

A-MAIN ACTION

• **2WD Modified**—the battle of the Francis brothers. As you probably know, Matt Francis recently switched rides and now drives Team Losi cars and trucks. His brother Mark, however, is quite content with his Team Associated vehicles and does not foresee a change of sponsors. This means that the brothers are now competitors, and this was perfectly clear during the 2WD Mod Mains when they clawed and scratched for position.

In the first Main, Brian Kinwald gladly took the third spot and hung back, but the brothers fought to the end. Matt managed to win the first Main, but it was a photo-finish because he was less than 1/100 second faster than Mark.

The second Main saw the same type of action. Again Matt edged out his brother (but barely) for the win, and Kinwald settled for third. This was Matt's second win, so he had won overall, and the final Main would determine second and third.

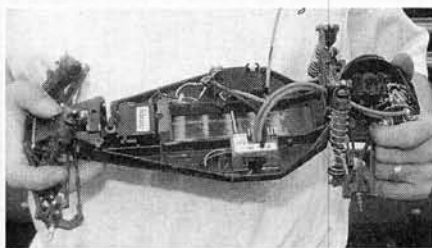
In the final Main, Brian Kinwald smoked the competition, and that helped him capture second overall; Lloyd Dassonville took second, while Jimmy Jacobson rolled in third. As it turned out,

High-Tech Goodies from Hitec

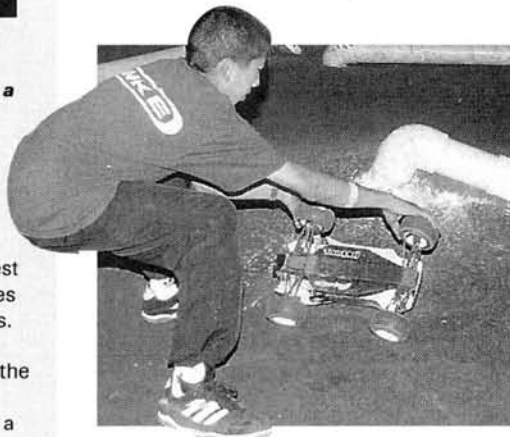
During one of my walks through the crowded pit areas, I ran into Mike Mayberry from Hitec/RCD Inc.* I've seen Mike at just about every race I covered during the past year. Hitec's presence at all these races leads me to believe that the company is now going after the high end of the R/C industry. Traditionally, racers have been the hardest customers to please, but Mike is confident that even the hardcore speed merchants will be impressed by Hitec's latest offerings, and judging by the pro-level Lynx HFX speed control, I think he's right.

To provide super-smooth, efficient power transfer, the Lynx HFX features the latest in FET technology. According to Mike, the new FETs are twice as efficient as the ones used in the past, and the unit is kept small because it needs only three forward FETs. Other features include: current-limiting dial; setup buttons; monster 12-gauge wire (only three wires instead of the usual four); motor wires and battery wires that exit the top so the controller is easy to install.

What else can we expect from Hitec? How about two new FM radio systems and a new mini FM receiver that's compatible with all Futaba and Airtronics radio systems. The company is also about to release several new servos that were designed with performance and compatibility in mind. Hitec is on the move, so don't be surprised if you find their products making a big showing on A-Main grids of major off-road races.



This Associated RC10B2 is controlled by a Hitec* servo, ESC and radio system. Hitec equipment feels right at home mounted on a pro-level chassis.



Quick turn marshals are always appreciated. This racer takes his marshalling very seriously.



4WD Mod winners.



Mod Truck winners.



2WD Stock winners.



Stock Truck winners.



2WD Mod winners.

WINNERS

Fin. Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires (F/R)	Traction additive	Pinion/Spur
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2WD Stock

1	1	Matt Francis	Losi	Peak	Orion	LRP	Airtronics	Losi	Losi/Losi	Buggy Grip 2	NA
2	3	Jimmy Jacobson	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Traction Action	22/81
3	4	Lloyd Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Traction Action	21/83
4	2	Bryce Beaver	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Associated	22/81
5	8	John Scott	Associated	Reedy	Reedy	Tekin	Airtronics	Associated	Losi/Pro-Line	Associated	24/81
6	7	Rob Thorpe	Associated	Maxtec	Maxtec	LRP	Futaba	Associated	Losi/Pro-Line	Traction Action	23/81
7	5	Eddie Bernal	Associated	Motor Man	Orion/Reedy	Tekin	Airtronics	NA	Losi/Pro-Line	Brakleen	24/81
8	9	Albert Guardado	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Losi	NA	24/84
9	10	Ryan Norris	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Traction Action	22/81
10	6	Brad Nibelink	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	NA	22/83

2WD Modified

1	1	Matt Francis	Losi	Peak	Orion	LRP	Airtronics	Losi	Losi/Losi	Buggy Grip 2	NA
2	4	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	NA	NA	Buggy Grip 2	NA
3	3	Mark Francis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Associated	18/81
4	7	Jimmy Jacobson	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Traction Action	20/81
5	5	Lloyd Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Traction Action	18/83
6	8	Gabe Boudreau	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Pro-Line	Buggy Grip 2	18/86
7	6	Phillip Atondo	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Losi	Zip Grip	20/84
8	10	Brad Nibelink	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	NA	20/83
9	2	Barry Baker	Associated	Maxtec	Orion/Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Traction Action	19/84
10	9	Bryce Beaver	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Associated	18/81

Truck Stock

1	1	Jimmy Jacobson	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Traction Action	20/87
2	2	Brad Nibelink	Associated	Motor Man	Reedy	Novak	Airtronics	Associated	Pro-Line/P-Line	NA	NA
3	3	Chris Schoppe	Associated	Motor Man	Orion	Tekin	Airtronics	Associated	Pro-Line/P-Line	NA	21/87
4	6	David Goss	Losi	Bennett	Orion	Novak	Airtronics	Losi	Losi/Losi	Buggy Grip	22/88
5	4	Ben Aromin	Losi	Motor Man	Trinity	Tekin	Airtronics	Losi	Losi/Losi	Trinity	21/88
6	7	Justin Morrison	Losi	Peak	Pro Match	Tekin	Airtronics	Losi	Losi/Losi	NA	22/87
7	8	Bryan Winbert	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	NA	21/87
8	5	Brain Strange	Associated	Peak	Motor Man	Tekin	Airtronics	Associated	Losi/Pro-Line	NA	22/87
9	10	Scott Schroeder	Associated	Peak	Pro Match	Novak	Airtronics	Associated	Pro-Line/P-Line	NA	21/87
10	9	Cameron Eccel	Losi	Moots Motor	Orion	Tekin	Airtronics	Jammin'	Losi/Pro-Line	Buggy Grip	21/88

Truck Modified

1	2	Mark Francis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Associated	18/87
2	3	Scott Hughes	Associated	Reedy	Reedy/Orion	LRP	Futaba	Associated	ProLine/P-Line	Associated	18/87
3	1	Gabe Boudreau	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Pro-Line	Buggy Grip 2	20/90
4	5	Lloyd Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	Traction Action	18/87
5	4	Bryce Beaver	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Associated	18/87
6	7	Alex Guerrero	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	NA	19/84
7	8	Brad Nibelink	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi/Pro-Line	NA	18/87
8	10	Jeff Lewis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Traction Action	18/87
9	6	Shawn Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line/P-Line	Traction Action	18/87
10	9	Jason Moberly	Losi	Trinity	Orion	Novak	Futaba	Losi	Losi/Losi	Buggy Grip	17/88

4WD Modified

1	1	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	NA	NA	NA
2	2	Matt Francis	Losi	Peak	Orion	LRP	Airtronics	Losi	Losi/Losi	Buggy Grip 2	NA
3	3	Gabe Boudreau	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Losi	Buggy Grip 2	20/84
4	7	Jimmy Jacobson	Yokomo	Reedy	Reedy	LRP	Airtronics	Yokomo	Pro-Line/P-Line	Traction Action	18/87
5	4	Alex Guerrero	Losi	Maxtec	Maxtec	Novak	Airtronics	Losi	Losi/Losi	NA	19/84
6	6	Phillip Atondo	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Losi	Zip Grip	19/84
7	9	Albert Guardado	Losi	Peak	Orion	Novak	Airtronics	Losi	Losi/Losi	NA	22/84
8	8	Jason Moberly	Losi	Reedy	Orion	Tekin	Futaba	Losi	Losi/Losi	Buggy Grip	17/84
9	5	Barry Baker	Yokomo	Maxtec	Orion/Reedy	LRP	Airtronics	Yokomo	Pro-Line/P-Line	Traction Action	19/87
10	10	Jeff Wittman	Yokomo	Maxtec	Maxtec	Tekin	Airtronics	Yokomo	Pro-Line/P-Line	NA	16/87

Matt Francis (as you know) claimed first, Brian Kinwald ended up second, while Mark Francis settled for third.

• **Truck Stock.** Jimmy Jacobson effortlessly won this and was the only driver in his class to post 14 laps. The battle for second and third between Brad Nibbelink and Chris Schoppe, however, was not officially over until their cars crossed the line at precisely the same moment. Once again, the AMB lap-counting system split atoms and determined that Brad was a split-second faster than Chris.

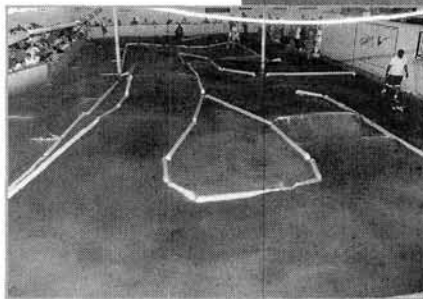
• **2WD Stock.** Stock racers had only a single A-Main to contend with, but the action was as hot as ever. Through most of the race, TQ Matt Francis and Jimmy Jacobson led the way while swapping positions (and paint) at every corner. Lloyd Dasonville and Bryce Beaver also put in fantastic performances and made sure the spectators got their money's worth. Matt won with a 14/4:07.63; Jacobson rolled in less than a second later to post a 14/4:08.00; and Dasonville came third with a 14/4:15.19.

• **Truck Modified.** In the first Main, TQ Gabe Boudreau shot out in front with Mark Francis, Lloyd Dasonville and Shawn Dasonville in tow. He held his ground through most of the race, but things got a little tricky when the four started to lap the slower traffic. Matt took the lead and crossed the line first, followed—only seconds behind—by Boudreau, Lloyd Dasonville and Shawn Dasonville in that order and on the same lap as the leader.

Mark Francis also won the second Main, and this earned him the overall win in Truck Modified. His win didn't come easily, however; Scott Hughes made a strong showing and challenged Francis to the end. Gabe Boudreau was also in the running throughout, but he just didn't get the breaks he was looking for and ended up in

Right: spectators cheer on the racers.

Below: the track. Notice the giant straightaway on the left; speeds in excess of 25mph were reported!



third. Less than 3 seconds separated the first three.

Mark Francis was already the Truck Mod winner, so in the third and final Main, he accepted an honorable DNF. Scott Hughes literally ran away with the race, while Gabe Boudreau and Alex Guerrero battled for second. At the end, it was Hughes who won the Main and second place overall while TQ Boudreau settled for third overall.

• **4WD Modified.** TQ Brian Kinwald was the star of this show, but Matt Francis never gave him a chance to catch his breath. At the start of the first Main, Kinwald, Francis, Gabe Boudreau and Alex Guerrero all shot out in a dust storm that would have made the "Tasmanian Devil" proud. The top four cars were Team Losi XX-4s, and these things were on fire. Kinwald found the fastest line and kept his car on four wheels throughout to win the first A-Main. Francis finished a few seconds behind Kinwald, and Boudreau and Guerrero rolled in to finish third and fourth, respectively, about 5 seconds later.

In the second Main, Kinwald again shot out in front, while Matt Francis, Jimmy Jacobson and Phillip Atondo followed at a close pace. During the ninth lap, Kinwald's car broke and he was out of the race altogether. Francis was quick to take advantage of Kinwald's misfortune; he took over the lead, was never challenged and won effortlessly. After a long battle, Jimmy Jacobson and Phillip Atondo rolled in to claim second and third, respectively.

Before the start of the final Main, it was evident that the 4WD champi-



Roger and Anne Hubbard watch the action in the Truck Stock class.

onship was still up for grabs (no runaway winners here). The big battle was between Brian Kinwald and Matt Francis, and no one could predict the outcome. (I would have paid good money to see this race; luckily, I was there to cover the event!) These two world champ drivers put on a show of spellbinding precision driving, but there could be only one winner, and though my eyes saw their XX-4s cross the line together, the automatic lap counting system put Kinwald in front by less than 1/100 second. When the points had been tallied, Kinwald took the overall win; Matt Francis took second and Boudreau rounded things off in third.

FINAL THOUGHTS

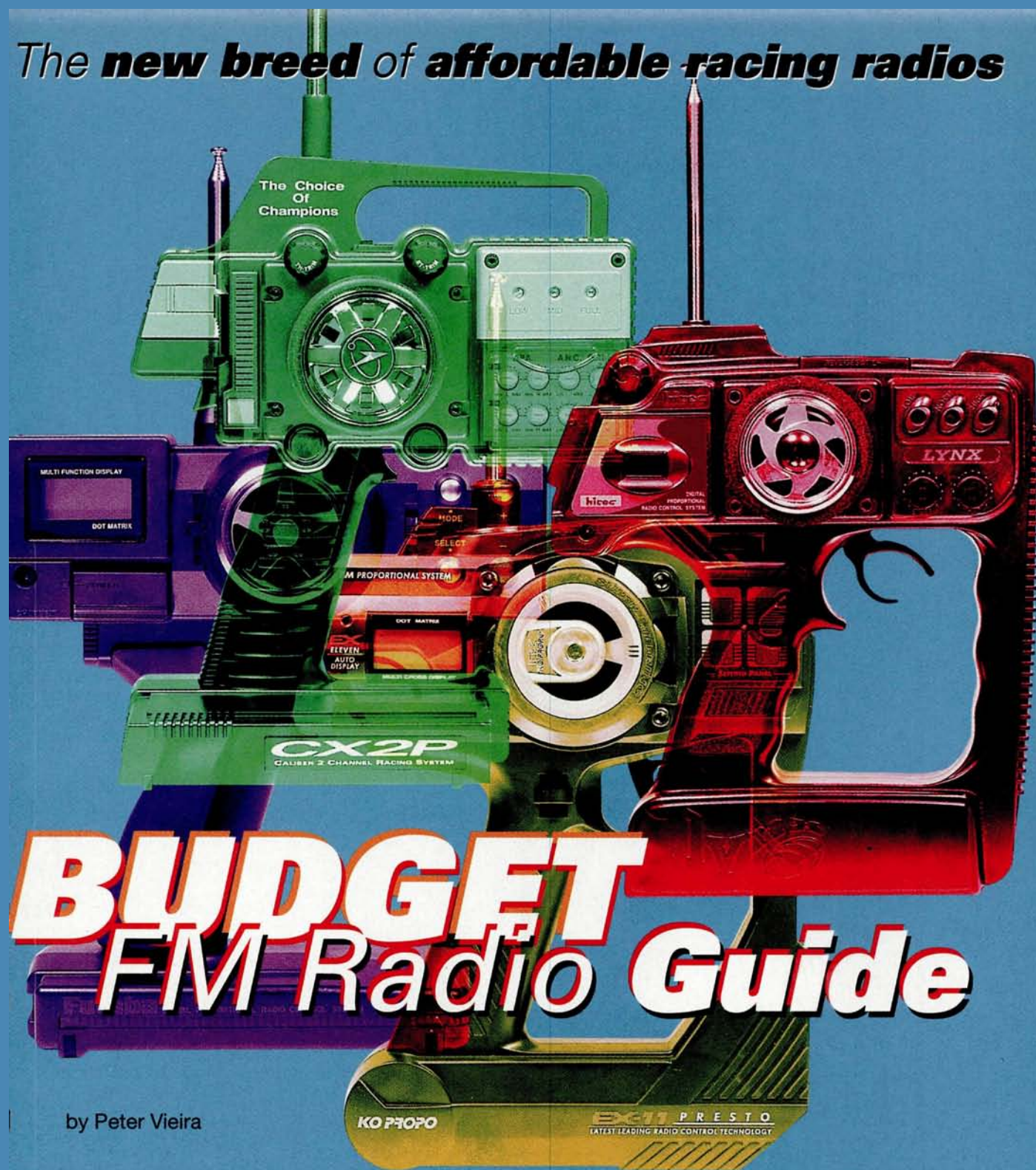
Like the four that came before it, the Fifth Annual Motor Man Challenge was a complete success. This proves that the folks at Hobby Warehouse know how to run a race, and who knows?; maybe we'll see some sanctioned races at the Hobby Warehouse facility. One thing is sure: they would be first-class operations. Congratulations to all the drivers who competed; even if you didn't take home a trophy, you're all winners in my book. Until next time

**Addresses are listed alphabetically in the Index of Manufacturers on page 200.*



Top qualifier and overall 4WD champion Brian Kinwald wrenches on his buggy—one of the few times Brian didn't have a crowd around his pit area.

The **new breed** of **affordable racing radios**



BUDGET FM Radio Guide

by Peter Vieira

YOU'RE NOT controlling that graphite-everything, four-wheel-drive, titanium-hardware, best-of-the-best racer with a clunky old AM radio, are you? Get with it! Even if you blew all your birthday money on your rig, you can still afford to go FM with the new crop of "cost-conscious" frequency modulators on

the shelves today. In addition to having stronger signals and clearer reception, FM radios pack plenty of features that make it easier to drive your car to its full potential; if you're a racer, that means more trips to the winners' circle. If you're just out to have fun, you'll have even more!



HITEC LYNX FM



Based on the Hitec* Lynx AM radio case, the all-new 2-channel Lynx FM is feature-filled and has a super-low price. "How low?" you ask. How does around \$99 at hobby shops sound? Yes, that's right; it is by far the lowest-priced FM radio around. Although the Lynx FM isn't computer-controlled and doesn't have model memory capability, it does have all the features most racers look for, such as steering dual rate, throttle and brake EPA and analog steering and throttle trims. The Lynx FM also has a unique feature—a steering rate override button (SRO). It allows you to override the thumb-screw-adjusted dual rate to a predetermined position for use in tight corners or when maneuvering on the starting grid, without having to fiddle with the dual rate. With all these features and a low, low price, expect to see more Lynx FMs at your local track. (Production radio will differ from model shown.)

KO PROPO EX-11



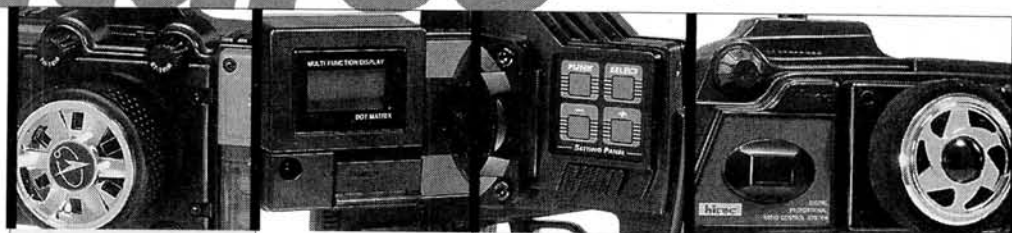
I won't make any cracks about the new KO Propo* EX-11 being a "knockout" because it's made by KO. That would be too easy. Know what else is easy? Using this radio. Fully computerized, the EX-11 features a Direct Mode where you can assign one of the radio's functions to one of the four grip dials. When the dial is pressed, the function will work and the LCD display automatically shows the adjustment as it takes place—no more skipping through menus. Model memory is in there, too, with enough room to store your three favorite cars. Some features you won't find elsewhere include ABS to help prevent brake lockup, adjustable LCD contrast (great for those sunny days on the parking lot!), a sealed membrane keypad and the capability to go 4-channel. The EX-11 is a real knock ... uh, it's a top-notch transmitter.

Glossary of Terms

- **Third-channel proportional.** A non-proportional third channel is simply "on" (servo at full extension) or "off" (servo at rest). A proportional third channel allows you to move the servo a little or a lot, quickly or slowly, just as you do with the steering and throttle channels.
- **Battery meter.** This may be a needle gauge, a group of LEDs, or a digital readout; the meter indicates battery strength.
- **Battery eliminator circuitry (BEC).** This allows the receiver to shunt off excess voltage when running the radio system off your car's 7.2V pack. Back in the old days, you needed a separate 4-cell pack just for the radio gear. I'm glad those days are over!
- **Channels.** All cars run off two channels—one for steering; one for throttle and brake. A third channel can be used to operate an onboard starter, deploy a parachute, flash headlights, etc.
- **Direct servo control (DSC).** This physically links transmitter to receiver so that you can operate your car's radio system without actually transmitting a signal and interfering with other drivers.
- **End-point adjustment/adjustable travel volume (EPA/ATV).** This allows you to adjust how far the servo moves in response to the input from the trigger or wheel; for instance, you may wish to use very little steering throw for racing on an oval track. Instead of trying to carefully control how far you turn the wheel, EPA/ATV lets you adjust your radio so that the servo moves only a little when the steering wheel turns from lock to lock.
- **Fail-safe.** A great feature for gas cars, a fail-safe will return the servos to a preset position (usually full brake!) if the radio signal is lost.
- **Frequency band.** For surface use, modelers may use 27 or 75MHz; 75 offers the most channels, but 27 may glitch less, especially in a gas car. Some radios have removable radio frequency (RF) modules that allow them to switch between 27 and 75MHz.
- **Stopwatch.** C'mon; you know what a stopwatch is, don'tcha? A hand-held stopwatch is great for practice; unfortunately, you need both hands to drive. Radio stopwatches are tripped by a

(continued)

features *at a glance*



	Airtronics CX2P	Futaba 3PD	KO EX-II	Hitec Lynx FM
Channels	2	3	4	2
FM/PCM	FM	FM	FM	FM
EPA/ATV throttle	Yes	Yes	Yes	Yes
EPA/ATV steering	Yes	Yes	Yes	No
Exponential steering	Mild, linear or quick mode	Yes	Yes	No
Exponential throttle	Linear or mild mode	Yes	No	No
Dual-rate steering	Yes	Yes	Yes	Yes
Wheel/stick tension adj.	No	No	No	No
Adjustable throttle neutral	No	No	No	No
Battery meter	LED indicator	Digital display	LED/Digital Voltmeter	LED
Low-battery warning	Audio alarm	Audio alarm	Audio alarm	Flashing LED
Ni-Cd charge jack	Yes	Yes	Yes	Yes
BEC	Yes	Yes	Yes	Yes
Left-hand adaptable	Yes	No	No	No
Power supply*	8AA batteries	8AA batteries	8AA batteries	8AA batteries
Power output	500mW	750mW	750mW	500mW
Frequency band	27 or 75MHz	27 or 75MHz	27 or 75MHz	27 or 75MHz
Warranty	1 year	1 year	1 year	1 year
Servo trim	Analog	Digital	Digital	Analog
Sub-trim	No	No	No	No
Model memory	No	3	3	No
Plug-in RF mode	Yes	No	No	No
Receiver	92236 FM	R113 FM	KR-297FZ	NA
Servos**	94102 (2)	S3003 (2)	Not applicable	HS303
Suggested retail	NA	\$349.95	\$249.95 (TX/RX only)	\$149.95
Available at	\$174.99	\$189.95	\$189.95 (TX/RX only)	\$99.95
Additional features			ABS braking 4-channel capability Direct Set	Steering rate override button (SRO)

* Batteries are not included. ** Other servo combinations are available.

Glossary of Terms (continued)

thumb switch or a button right in the steering wheel, and they're mighty handy.

- **Lap timer.** A function of the stopwatch, this feature lets you time a bunch of laps and review the times later.
- **Left-hand adaptable.** Most of us drive "right-handed," using the left hand for throttle and the right for steering. Some radios allow you to steer with your left hand and operate the throttle with your right hand.
- **Low-battery warning.** Most often, this is a beeper, but sometimes, it's a flashing light, and it indicates a dangerously low battery. It usually goes off just after the start of your main.
- **Model memory.** Ever try to race two classes with one radio and forget to reverse your steering when you switched cars? Smacka-whacka! Model memory is a great innovation. Some radios actually show the names of the cars in the memory; select the one you want, and the radio instantly loads your pre-selected trims for that vehicle—a big plus.
- **Ni-Cd charging jack.** Just leave your Ni-Cds in the radio, plug in the charger, and go to bed. Excellent for you Monday/Wednesday/Friday/twice on Sunday racers.
- **FM/PCM.** All the radios featured here are FM, or frequency modulation, designs. PCM stands for pulse code modulation—the least glitch-prone way to send a radio signal. Some radios can be switched between FM and PCM modes, but the receiver is dedicated to one or the other.
- **Servo-reversing.** Perhaps the most basic feature of any radio, servo-reversing allows you to select which way the servo will turn when it's told to move "right" or "left." That way, your servo placement isn't dictated by which way the servo needs to turn.
- **Subtrim.** A fine trim adjustment. It has the same effect as the usual trim dial, but it moves the servo in very small steps.
- **Wheel-tension adjustment.** If you're too weak to turn the steering wheel, this feature allows you to reduce its spring tension (hint: hit the gym); conversely, you can crank up the tension and develop those muscular fingers that you've been dreaming of.

AIRTRONICS CX2P



The latest offering from Airtronics* packs new analog innards into the popular Caliber 3Ps case. Analog means there's no LCD, but that's not a bad thing; instead of cycling through screens (and taking a hand off the radio to do so), you can just sneak a peek at the adjustment pots to see what's what. Lefties should flock to the CX2P because it can be easily converted for southpaw use—always a plus. Airtronics takes the guesswork out of throttle and steering exponential adjustments by offering ARC, or adjustable rate control. Instead of monkeying with percentages, simply select one of the presets for mild, linear, or quick response. Additional features include an audible low-battery alarm, dual-rate steering and a removable RF module for 27MHz and 75MHz capability.

FUTABA 3PDF

Futaba* has streamlined their NASA-ready 3PJ into the sleek, affordable 3PD. Though it doesn't have all the features of the J, this radio has everything it takes to make you a winner. Features include an LCD screen, exponential throttle and steering, digital servo trims, assignable grip dials and a third channel you can use to operate an onboard starter, shift a gearbox, make a driver figure wave You get the idea. The 3PDF also features model memory for three cars. Thanks to an all-digital design, you can select a model from memory with just a single button click; there's no need to match analog trims to the display. The 3PDF's best feature just might be the most low-tech: it has a super-comfy case with easy-to-reach controls. ■





Team Japan invades the United States! Four of the six Yokomo Team drivers made the 2WD A-Main, and five of them made it into the 4WD A-Main; the sixth driver qualified 11th overall.



IFMAR Worlds Warm-up Race **Team Japan** **sweeps the**



The man on a mission: Masami Hirotsuka was on fire all weekend and claimed overall wins in both the 2WD and 4WD classes.



Here's a closer look at Masami's winning Yokomo YZ-10 "Works" car and his Associated RC10B2 buggy.





Brian Kinwald prepares for one of his 2WD A-Main runs. Will he get his second IFMAR title in '97? Will he bring Losi their first ever IFMAR championship? He's the team's odds-on favorite to do so.

by Staff

IF YOU ASK any off-road R/C racer which race they'd most like to win, they'd probably answer: the IFMAR 1/10-scale Electric Off-Road Worlds—a pros-only invitational. But no one becomes a world champion overnight. For months before the Worlds, the racers practice extremely hard to find the best setups while they hone their driving skills. The IFMAR Warm-up Race gives racers from all over the world an early opportunity to test their setups and skills on the track where the event will be held and to check out what their competition has to offer.

This year, 156 of the world's top racers gathered at the Ranch Pit Shop in Pomona, CA, and the competition was expected to be fierce. Current world champions Matt Francis and Mark Pavidis were there to better their odds of defending their titles

at the upcoming World Championships. Matt and Mark were joined by top drivers such as Masami Hirotsuka, Brian Kinwald and Jukka Steenari, to name just a few. Racers and spectators

were also very interested to see how the new Losi XX-4 would perform against the more seasoned Schumacher and Yokomo 4WDs.

Ranch

THE TRACK

The Ranch crew laid out a very challenging track; it included a large tabletop jump that was approached straight on coming directly toward the drivers, a washboard section (the racers' worst nightmare), a difficult rhythm section (three sets of doubles) and a long straightaway leading into a high-speed sweeper. It wasn't too long before a large hole developed on the front side of the tabletop. This made it difficult to take the jump consistently because the hole in the jump was opposite the drivers' stand and was impossible to see. As the hole started to develop, drivers were taken by surprise because they had no idea that it even existed.

By the start of qualifying, the track had developed a blue groove that resulted in extremely fast lap times. Little traction compound was used because the blue groove provided good bite; in fact, many Pro-Line drivers opted for M2 tire compound over the stickier M3. The 90-degree-plus weather didn't seem to affect traction much, but the motors and batteries ran fairly hot. The motor builders complained loudest about the temperatures; they had to wait for the motors to cool down before they could start to rebuild them between qualifying rounds.

A new way to qualify

To determine the starting order for the Mains, four qualifying rounds were run. Because this was an IFMAR event, the qualifying rounds were 5 minutes long, as opposed to the ROAR standard of 4 minutes. Rather than the typical qualifying format—in which the fastest single qualifying time is used—a new system was introduced at this race for the IFMAR classes; it will also be used at the Worlds.

The new format awards points to each driver for each round of qualifying based on his or her position in that particular round. The fastest driver for the round is awarded 155 points; the second fastest driver receives 153 points; the third fastest gets 152; and each successive driver is awarded points in 1-point decrements (151, 150, 149, etc.). At the end of the four rounds of qualifying, the three highest scores for each driver are totaled. The theory behind this new qualifying system is that it will eliminate the so-called "rocket round."

IFMAR isn't the only organization to use this qualifying system. ROAR has also adopted it for all of the 1997 ROAR Nationals. Does it really work better? We'll just have to wait and see. Most drivers however, seemed to enjoy the new system at the warmup.

IFMAR WORLDS WARM-UP

• **2WD qualifying.** It was soon apparent that the Japanese Yokomo team had done their homework. They had been at the track for a week prior to the event, and their efforts paid off. Masami Hirotsuka, Atsushi Hara, Akira Suzuki and Hiroshi Suzuki all turned in very fast times. In the first round, Billy Easton was the fastest American, and he finished second. In the second round, Mark Pavidis, one of the favorites coming into the race, scored his best result with a third-fastest time for the round. Mark Francis plugged away and consistently scored in the top 10. In the end, Masami took the TQ position, followed by Mark Francis and Hiroshi Suzuki.

• **4WD qualifying.** The Yokomo team's outstanding efforts earned them great results. Atsushi Hara seemed to be the fastest of the group; in the first two rounds, he posted the fastest times; Masami finished a very close second. Jukka Steenari seemed to have a tough time in the first few laps, but when he got going, he turned in some of the fastest single lap times with his Schumacher. With their XX-4s, Greg Hodapp, Brian Kinwald and Matt Francis were consistently near the top.

In the end, Masami and Atsushi were tied for points; in the new qualifying system, a tie is broken by adding in a driver's fastest time from a single qualifying round. Because Masami achieved the fastest qualifying time, he ended up in the TQ position. Atsushi placed second, and Mark Pavidis rounded out the top three. Of the six Japanese Yokomo drivers, five made the

top 10, and the sixth qualified in 11th place. Their dedication really paid off.

MAINS

Using the triple-A-Main format, the Mains got under way early on Sunday afternoon. Everyone was



Site of the upcoming '97 IFMAR Off-Road Worlds, the Ranch Pit Shop in Pomona, CA, is one of the most demanding off-road tracks in the U.S.

anxious to see whether Masami could take advantage of both of his TQ positions and go on to take the win in both classes. Would the Japanese drivers continue their dominance in the Mains? Without a doubt, the most anticipated battle would be the race between Masami and Atsushi in the 4WD class.

• **2WD.** Of the top 10 drivers, there were five Team Yokomo/Associated drivers from Japan and five from the United States; Brian Kinwald was the only driver running for Team Losi. Would Brian be able to best the field of nine Associated cars? He was certainly going to try. At the start of the first Main, Masami put a little distance between himself and the rest of the pack. He continued to stretch his lead and won

convincingly. Mark Francis held on to his second qualifying position, and Barry Baker worked his way up all the way from ninth to finish third.

The second Main was similar to the first as Masami left the rest of the field behind again to take the win. Atsushi challenged in the early part of the race before fading slightly and finishing a strong second. Mark Francis rounded out the top three.

Although Masami had already clinched the overall win with two first-place finishes, he decided to compete in the third race. I guess he figured he didn't come here all the way from Japan to watch! Not only did Masami win the third race as well, but he also proved to be the most consistent driver on the track. All three of his Main event times were within 2 seconds of one another. And remember, these are 5-minute races. This time, however, Hiroshi Suzuki finished second with Mark Francis in third.

When all the points and the scores had been totaled, Masami took the 2WD win

(Continued on page 194)

2WD

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires (F/R)
1	1	Masami Hirotsuka	Associated	Reedy	Yokomo	Tekin	KO	Associated	Losi/Pro-Line
2	2	Mark Francis	Associated	Reedy	Reedy/Orion	LRP	Airtronics	Associated	Pro-Line/Pro-Line
3	4	Atsushi Hara	Associated	Reedy	Yokomo	LRP	KO	Associated	Losi/Pro-Line
4	3	Hiroshi Suzuki	Associated	Reedy	Yokomo	Tekin	Futaba	Associated	Losi/Pro-Line
5	7	Mark Pavidis	Associated	Reedy	Reedy/Orion	LRP	Airtronics	Associated	Losi/Pro-Line
6	5	Akira Suzuki	Associated	Reedy	Yokomo	Novak	Sanwa	Associated	Losi/Pro-Line
7	10	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi/Losi
8	9	Barry Baker	Associated	Maxtec	Reedy/Orion	LRP	Airtronics	Associated	Pro-Line/Pro-Line
9	6	Jimmy Jacobson	Associated	Reedy	Reedy/Orion	LRP	Airtronics	Associated	Pro-Line/Pro-Line
10	8	Shinnosuki Adachi	Associated	Reedy	Yokomo	Sanwa	Sanwa	Associated	Losi/Pro-Line

4WD

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires (F/R)
1	1	Masami Hirotsuka	Yokomo	Reedy	Yokomo	Tekin	KO	Yokomo	Pro-Line
2	2	Atsushi Hara	Yokomo	Reedy	Yokomo	LRP	KO	Yokomo	Pro-Line
3	9	Matt Francis	Losi	Peak	Reedy/Orion	LRP	Airtronics	Losi	Losi
4	7	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi
5	3	Mark Pavidis	Yokomo	Reedy	Reedy/Orion	LRP	Airtronics	Yokomo	Pro-Line
6	4	Jukka Steenari	Schumacher	Corally	Orion	LRP	Sanwa	Schumacher	Pro-Line
7	10	Toshihira Hirai	Yokomo	Reedy	Yokomo	Tekin	Sanwa	Yokomo	Pro-Line
8	5	Greg Hodapp	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Pro-Line
9	8	Shinnosuki Adachi	Yokomo	Reedy	Yokomo	Sanwa	Sanwa	Yokomo	Pro-Line
10	6	Akira Suzuki	Yokomo	Reedy	Yokomo	Novak	Sanwa	Yokomo	Pro-Line

winners

racing

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Send photos with captions to "Grassroots Racing," Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606.

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**Kyosho R/C
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ext. 085F

**Hobby Shack
Parking Lot**
(714) 964-8846

**Hobby Town USA
Parking Lot**
(402) 434-5050

**Trinity Street
Spec Series**
(908) 862-1705



Most of the racers gathered for the TCS "team" photo after a day in the sun.

TCS #37

Tamiya Championship Series

It's that time of year again ... and the Tamiya Championship Series (TCS) races are back in full swing. TCS #37 was held at Hobbies in Tulsa, OK, where a total of 63 racers turned up to compete.

Twenty-eight F1, 13 FWD, 28 4WD, seven Indy Spec and 11 Mini-Sport cars were whittled down to these five winners.



These lucky TCS #37 winners have the option to come together again at the Tamiya Nationals this September in Aliso Viejo, CA.



This well-groomed parking lot looks as if it was MADE for touring cars. The well-marked layout provides ample space for the racers to wind their way around to the finish line while they battle for first!

Winners

F1

1	Jason Davis
2	Justin Mueller
3	Russ Johnson
Best of Show	Andy Houston
TQ	Jason Davis
Top Rookie	Brian Schaad

FWD Sedan

1	Randy Cook
2	Mike Wood
3	Sedar Aytemiz
Best of Show	Bob Enochs
TQ	Randy Cook
Top Rookie	Ricky Perry

4WD Sedan

1	Randy Cook
2	Sam Daugherty
3	Robert Enochs
Best of Show	Dave Rowan
TQ	Randy Cook
Top Rookie	Ricky Perry

Indy Spec

1	Tony Keithly
2	Pat Bailey
3	Marvin Blake
Best of Show	James Dankenbring
TQ	Tony Keithly

Mini Sports

1	Hiroiyuki Watanabe
2	Kevin Camp
3	Mark Henderson
Best of Show	Hiroiyuki Watanabe
TQ	Hiroiyuki Watanabe

24 Hours of Touring Cars

Race coverage courtesy of Auto RCM magazine (France)

by Vincent Vandenberghe



Team Schumacher stayed awake long enough after the race to pose with their winning car and trophies.

Here in the States, when we go to the parking lot with our touring

cars, we anticipate three, maybe four hours of racing. When we've blown through all our battery packs and the sun has gone down, we pack our pit bags and head for the hills. Well, for the last few years, in several overseas locations, races have been run a little differently: teams arrive equipped to last for 24 hours of racing, and they don't leave for a day.

This year, just over the border from the site of the Le Mans 24-hour race in France, the Tom Pouce R/C Car Club of Gembloux, Belgium, organized a 24-hour touring-car race to raise money for seriously ill children.

Of course, when you run your R/C car NONSTOP for an entire day, you need to make certain preparations. So a set of regulations has been drawn up to ensure fair racing for all:

- A car is allowed a maximum of 20 Ni-Cd packs, five drivers and as many spare parts and mechanics as the team needs.
- Teams must turn-marshal their own cars for the duration of the race—from 4 p.m. Saturday to 4 p.m. on Sunday, nonstop.
- Transponder lap-counting is required, and the transponder batteries must last 24 hours on one charge.
- Racers must abide by the rules of the touring-car sanctioning body of the country in which they race.

Eleven teams showed up to test their endurance at the Tom Pouce race. Ten of the 11 toted 4WD touring cars, while the 11th came equipped with an Associated Dual Sport. In the pits, the teams averaged five or six chargers, 20 packs of Ni-Cds, three to five cars' worth of spare parts and boxes of spare wheels and tires.

Although it's difficult to imagine, racers kept up a quick and steady pace throughout the day—even at 3 a.m.—and some teams even picked up their pace as the race reached its final hours. The winning car—a Schumacher SST 2000 raced by Team Schumacher—ran 431 miles (690km) at an average speed of 18mph (28.75kph).



Mount Bodies

Line up your Lexan

by Kevin Meyer

IN RECENT YEARS, more attention has been paid to R/C vehicles' body aerodynamics, and this attention is well-deserved. The type of body and the way it's mounted can have a dramatic effect on your vehicle's handling. Some manufacturers have simplified matters by pre-drilling or marking the body-mounting holes, but hobbyists who use aftermarket bodies don't usually have this luxury. In this article, I'll explain the detailed mechanics of installing those Lexan shells with great results and little effort. You can mount even expensive, pre-painted bodies quickly and easily, without fear of messing things up!

Remember, battery packs and motors add considerable weight to a chassis; this can compress the suspension and possibly change the ride height. So before you start the project, prepare your vehicle as if you were going to run it. This will ensure correct wheel-well and mounting-hole alignment.

Things You'll Need

- Modified or short body posts (optional).
- X-Acto knife.
- Permanent pen.
- Dremel grinding tool with medium and small grinding wheels.
- Small drafting compass with razor tip (optional).
- Spare tire or round wheel-well scrap.
- Drill with an 1/8-inch bit.

Mounting Buggy and Truck Bodies

It's a piece of cake to mount buggy and truck bodies, especially if you trim and mount them before you mask and paint. Place the unpainted shell on the chassis; be sure that suspension-arm movement isn't restricted and that the shock towers have adequate room. Now mark the post positions. It's also easy to mount pre-painted off-road bodies. When you've located the holes for the body posts, use the "turtle" method again. Place the chassis on the overturned shell and check the shock towers' clearance. Be sure that neither the shock towers nor their mounting hardware rubs the body. Align the body side to side and front to rear. Use a permanent pen to mark the post positions on the inside of the body.



When you mount pre-painted off-road bodies, use the "turtle" method. It's important for the shock towers (front and rear) and suspension arms to have proper clearance. The positioning will dictate the mounting-hole locations.

Mounting Touring Car and NASCAR Bodies

There are several ways to mount sedan and NASCAR bodies. If you mark the holes before you paint the body, it makes the process easier and can save a lot of hassles later on. If you're

replacing one body with another, identical one and the original isn't too badly trashed, you can place the old body over the new and mark the mounting holes and wheel-well openings. That's the "quick and dirty" method. The most accurate way to mount a body is to use modified body posts. This process can be adapted to any body/chassis configuration; it requires an extra set of front and rear body posts, but that's a worthwhile minor expense.

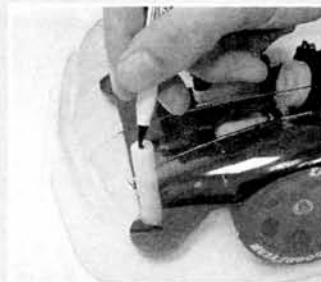
You can modify the extra set by cutting off the top portion of the posts so the body sits at its normal ride height; you can also use shorter body posts that just touch the inside of the shell. DuraTrax® offers mounting posts in 1/2-inch increments. I find this procedure works best. If you don't use modified mounting posts, draw a reference line through the center of the wheel opening to help line it

up. Mark the body posts' holes after you have matched up the wheels with the openings.

Because of the diversity of on-road and oval chassis wheel-bases, most NASCAR/NASTRUCK bodies have preformed wheel-well lines on the front wheels only.

(Touring cars usually have preformed lines on the front and the rear of the shell.) When you mount pre-painted bodies, use the pre-formed lines to cut out the front wheel openings. If you're working with a NASCAR body, after you've aligned the front wheel with the opening, mark the rear opening with the scrap you cut from the front opening. You can also use a tire to trace the outline on the body. Next, place the car upside down on a clean work surface; this is called the "turtle" method. To keep the body level and immobile and prevent it from being scratched, cradle it in a large towel. Place the chassis inside the shell, then align the chassis with the wheel openings. When the chassis is lined up front to back, check its positioning from right to left. Mark the mounting-post locations on the inside of the body with a permanent pen.

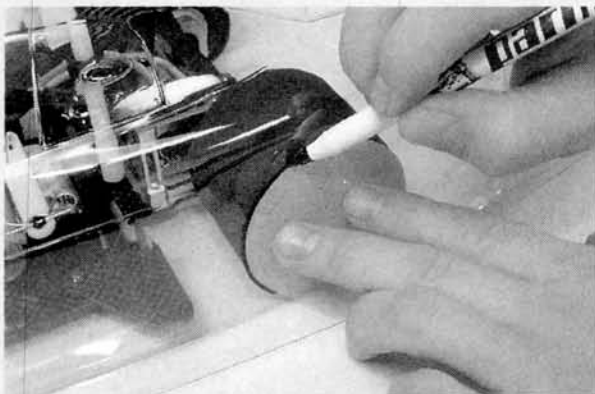
With the body posts in place, line up the wheel wells front to back. Be sure the body is centered on the chassis. Now you can mark the hole's location with a permanent pen.



If you don't use modified body posts to mark hole locations, make a line through the center of the wheel well outline on the body. This will help you eyeball the wheel alignment. When everything is lined up satisfactorily, make a mark where the holes are to be drilled.



Above left: it's easy to mount that pre-painted body using the "turtle" method. Turn the body over onto its top and place the chassis inside. Line up the wheels with the openings and center the chassis side to side. When the alignment looks good, use a permanent pen to mark the hole location. Cradling the body in a large towel will keep it level and prevent it from moving around while you're working on it. Above right: to get a nice, round circle, I like to use a small drafting compass with a razor tip to scribe the wheel-well openings. Place the pivot point on the center of the wheel opening, then scribe it with a clockwise turn of the compass. The razor tip makes a very clean cut. Make the openings undersized; you can adjust and trim them later.

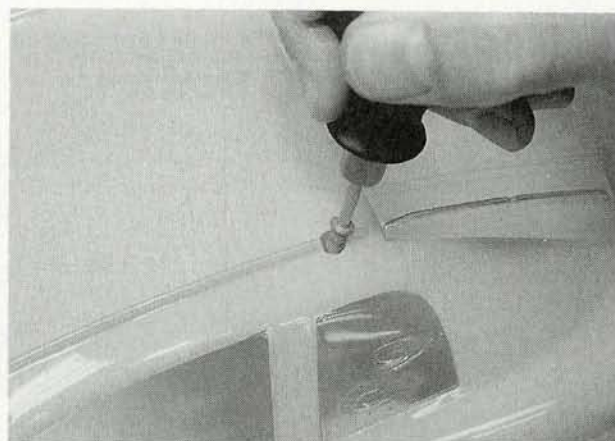


Wheel well scrap can be used as a guide to outline the wheel openings. Use the same method to mark the openings on pre-painted bodies, but make the outline on the inside of the shell.

HOW TO MOUNT BODIES

It's Drill Time!

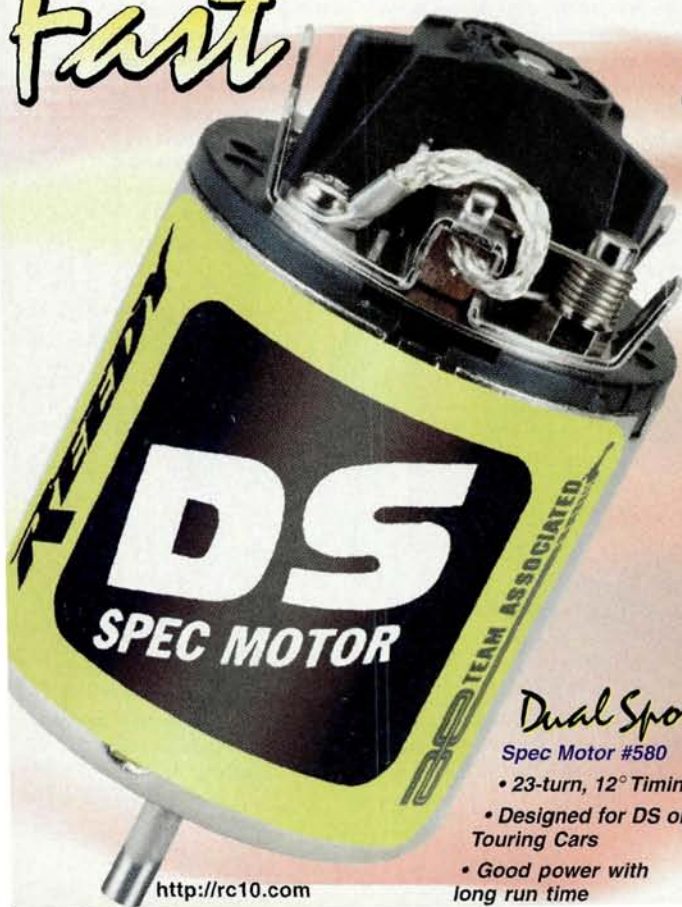
When you're ready to drill, start with a small pilot hole (about $\frac{1}{8}$ -inch diameter). Using a tapered hole reamer or a Dremel® tool with an $\frac{1}{8}$ -inch grinding tip, slowly enlarge the holes. Check the fit from time to time to be sure the body is correctly lined up on the chassis. To make minor adjustments in alignment, enlarge the front of the hole to move the body rearward; enlarge the rear of the hole to move the body forward. The same method can be used to shift the body from left to right or from right to left. The body should slip onto the mounting posts without binding. When you're satisfied with the fit, use foam body pads to make the fit even more snug and prevent any paint from being scraped off.



Drill a small pilot hole in the body. Use a Dremel tool with a small grinding attachment to slowly enlarge the holes for a proper fit. The body should slide onto the posts without binding. Body positioning can be adjusted slightly as you trial-fit the body. Enlarging the front of the hole will allow the body to be shifted rearward, and removing material on the rear of the hole will move the body forward.



Fast



Dual Sport

Spec Motor #580

- 23-turn, 12° Timing
- Designed for DS or Touring Cars
- Good power with long run time

<http://rc10.com>

Faster...

ROAR-L

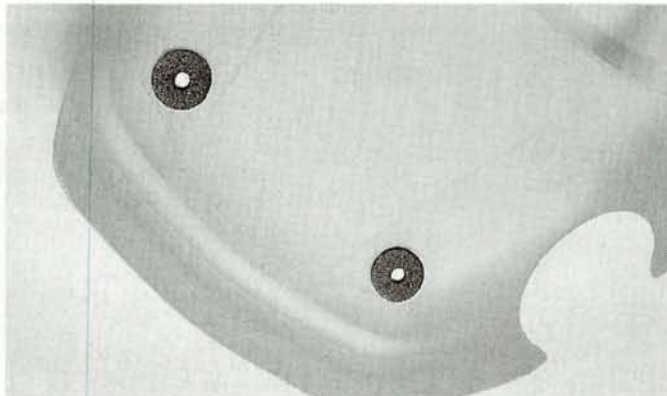
24



Fire Hawk

Stock Motor #300

- 27-turn, 24° Timing
- High Temp, High Strength magnets
- 1.4 Can material
- New Brush



Mini-mount foams attached to the inside of the body will give a snug fit and will prevent the body from bouncing and/or rattling. The pads also prevent the paint from being scratched.

After the body has been mounted, some trimming around the wheel openings may be necessary; how much trimming will depend on your tire size, suspension stiffness and track surface. If the wheels don't line up exactly with the openings, some trimming may be needed. Round off all sharp edges on the wheel openings to prevent tire gouging in case of an accident. Using the Dremel with a medium-size grinding wheel works great for this task.

Getting your R/C shells mounted and race-ready ain't no big thing. Just be cool and take it easy. You've gotten your modeling project this far; be patient and take your time. The result will be a neatly mounted body that you'll be proud to show off to all your buddies at the local racetrack!

**Addresses are listed alphabetically in the Index of Manufacturers on page 200.*

Wicked FAST!

Reedy Modifieds' Sonic2 and TriSonic Motors...

new 1.4 mm can, improved high-temp magnet strength, glass-filled nylon endbell with self-centering alignment system, brush-vibration dampening system, epoxy main balanced, and torque-tailored armature laminations.

The Choice of Champions!

Reedy Motors have powered 17 World Champions... more than all the other motor manufacturers combined!

REEDY Modifieds

Call or write for your free Reedy Catalog!

Tuning and Modifying the

TAMIYA F103

by Doug Mertes



Two Secret Tips!

Here are a couple of inside tips that have worked for me on the track:

- A side-by-side (LTO-style) battery pack of matched cells will just barely fit in the battery box that comes with the stock kit. Sometimes, especially when the tires are getting kind of small, the ends will drag on the ground during a hard turn. In a bad accident, the pack can pop out of one end. To prevent this, cut two 8-inch pieces of 1/4-inch-wide filament tape, and secure each one to the inside of a box end (see photos 2 and 3 in sidebar). Wrap them up and around the ends of the box and pull them tight across the upper chassis plate until they stick to each other. You'll never have a battery pack problem again!
- Because space to install a lap-counting transponder is limited (see photo 4 in sidebar), I mount the ESC directly behind the servo, and I place the receiver to one side, under the shock mount. That leaves enough space in front of the batteries to slide in a transponder; it's held in place by a rubber band that is wrapped around a metal ball end mounted behind the ESC. I've run my transponders this way for more than a year and have yet to lose one during a race.

SINCE ITS INTRODUCTION in the fall of 1993, Tamiya's* F103 series chassis has been a success on countless parking lots and schoolyards, not to mention in local, regional and national competitions. I race one of these in the weekly F1 Club of Washington points series, as well as five or six times every summer on pavement with the Hobby Works crowd, and I've come to the conclusion that this has become the best-selling F1 chassis in the U.S. simply because it works very well.

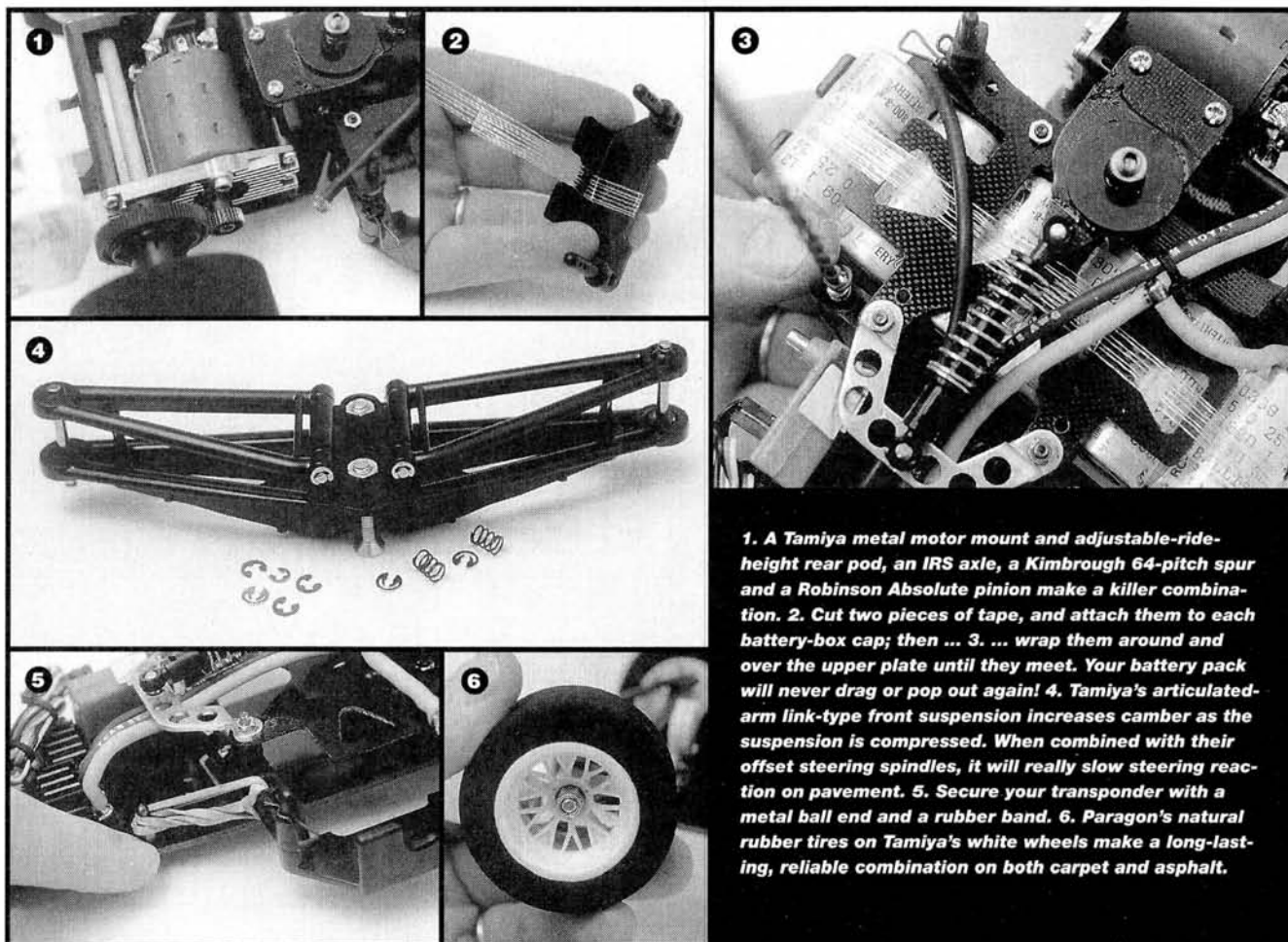
T-BAR TUNING

Like most T-bar designs, the F103 has a "sweet spot" base line setup to which you can make very small adjustments, one at a time, until the car handles just the way you like. The car runs really well right out of the box if you follow the chassis setup described in the instructions. Pay special attention to the length of the threads exposed above the T-bar screw locknuts, and make sure that there is an O-ring on each screw between the T-bar and the battery-holder crossbars. The T-bar should be loose enough to allow the rear pod to tilt easily from side to side, but not so loose that it wiggles on the screws.

MORE TRACTION

Most drivers would like to have more traction than the stock setup provides. If your F103 is a little "skatey," especially on asphalt, install one of Tamiya's ball-mounted T-bar setups for more traction. To adjust it, simply increase the viscosity of the goop on the damper plates until the rear-pod transition rate slows down and the rear tires slide instead of grab. Don't hesitate to experiment with all the lubes and greases in your toolbox, from shock oil to thick silicone syrups. The single damper plate on the 103RS works better than the two-plate system in the kits that come with body sets, so remove the top plate. The action will also be more consistent if you apply Teflon™ tape to both sides of the plate.

These cars react strongly to different tire compounds. Paragon's* long-wearing natural-foam-rubber tires are ideally suited to my driving style, but many drivers in our club like Pro-Line/Jaco's* white rears and purple fronts. Still others prefer



1. A Tamiya metal motor mount and adjustable-ride-height rear pod, an IRS axle, a Kimbrough 64-pitch spur and a Robinson Absolute pinion make a killer combination. **2.** Cut two pieces of tape, and attach them to each battery-box cap; then ... **3.** ... wrap them around and over the upper plate until they meet. Your battery pack will never drag or pop out again! **4.** Tamiya's articulated-arm link-type front suspension increases camber as the suspension is compressed. When combined with their offset steering spindles, it will really slow steering reaction on pavement. **5.** Secure your transponder with a metal ball end and a rubber band. **6.** Paragon's natural rubber tires on Tamiya's white wheels make a long-lasting, reliable combination on both carpet and asphalt.

green rears and blue fronts, but all of us agree that the front wheels need harder foam than the rears. Paragon Ground Effects traction compound works very well on both carpet and asphalt surfaces.

On carpet, you may find that the steering isn't quite as responsive as you'd like. If so, install a set of Associated* 0.013-inch front springs. The car will also initiate turns a little faster if you add a degree or two of toe-out to the front

tires. Turnbuckles are a necessity, and a set of Lunsford's* titanium ones are just the ticket. Use the inner ball location on the steering spindle for faster response on carpet; move it to the outer location on the asphalt. Run the steering linkage from the small Kimbrough* servo-saver to the bottom of the spindle (instead of the top) to reduce bump-steer. Tamiya's new articulated-arm front suspension will slow steering reaction on slippery parking lots.

HOW HIGH IS YOUR REAR END?

Tamiya has introduced a set of rear pod plates with several different ride-height options (the rear ride height should always be a little higher than the front). This is a terrific setup tool that also allows the frugal F103 owner to run rear tires down to a diameter of 49mm—much smaller than the standard rear-pod plates permit. That equates to two more weeks of racing on a set of rear tires, so the new plates will pay for themselves pretty quickly. The just-released adjustable-height metal motor mount really helps to keep the motor cool.

I've installed one of Irrgang Racing Service's* yellow fiberglass rear axles. It's

much lighter than the stock metal axle, just as tough and less expensive than the Tamiya hop-ups. The white wheels have the same strong design as the original kit parts, but their color makes it easier for folks with poor vision (like me) to see their car on the track. The Kimbrough 64-pitch spur gear sits on a Dan's* adapter that fits the Tamiya diff stem. Robinson's* new Absolute series of pinions are full width, light and perfectly cut, and they use a larger, 0.062-size setscrew for added security. I like HPI's* rear wing for two reasons: it's white (the vision thing, again), and it has an adjustable, 3-position upper spoiler.

Are all of these modifications worthwhile? Tamiya must think so, because their soon-to-be-released F103RX, based on the popular F103RS, will come equipped with the new front suspension, adjustable rear pod, and ball-mounted T-bar at considerable savings over purchasing the parts and chassis separately!

*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

PARTS LIST

- Tamiya rear-suspension ball mount, part no. 53273; adjustable-height gear case, 53257; aluminum heat sink for no. 53257, 53277; link-type front suspension, 53258; 3.5mm off-set uprights, 53259; Ferrari F310 body set, 50722; white wheel set, 50669.
- Paragon front foam donuts, TFP10; rear foam donuts, TRW10.
- IRS rear axle, 108.
- Ballistic Batteries matched Sanyo 2000 stick packs.
- Dan's spur-gear adapter, 10047.

Make your Electronics Waterproof & Dustproof

Protect your investment from the elements

by Joe Ringeisen

A Warning

Electronic components parts are delicate and can be damaged easily, especially if you get them wet while current is flowing through them. They are also expensive to replace. The purpose of this article is not to tell you how to make your electronics so completely waterproof that they are submersible, but rather how to make them more resistant to dust and accidental splashes. I don't recommend that you intentionally run your car in water or a wet area.

THE ELEMENTS

First, let's look at dust. (You'll have to squint really hard; sorry—bad joke.) Seriously, dust is everywhere. Because it's light, it can float even when the surrounding air is still. Dust can cover anything in a matter of minutes (just ask anyone who drives a black car). Basically, dust is the particle from hell.

As far as circuit-board electronics go, typical ground-surface dust is really more of a minor annoyance than anything. A light covering of dust that is cleaned off soon generally won't hurt a printed circuit board. On the other hand, dust that is allowed to become caked on the board and is left there for months can mean problems. The fact is, unless you run your car in an airlock, you'll never be completely rid of problem

HAVE YOU EVER considered how much abuse the electronics in your R/C vehicles receive? Maybe you run your car in a dusty area, and the dust gets inside to the electronics. Or maybe you've been tempted to run your R/C truck in mud or snow or through puddles, even though your radio manual cautions against this. After all, R/C boats run in water. And how much damage could a little water do, anyway?

Actually, it could do more damage than you might imagine. Electronics aren't cheap, and most of us try to make them last for a while before we have to replace them. So follow along, and I'll give you a few pointers on how to keep your electronics safe from dust and moisture.

dust. Does that mean that there's nothing you can do about it? No.

Water is a different story. Like dust, it's pretty good at getting into everything,

and electricity follows the path of least resistance. Unfortunately, this means that your electrical system will short out if it gets wet enough.

It may take some extra effort, but think of the peace of mind of knowing that your electronics will stay drier and cleaner.

but it can do far worse damage to your electronics in a short time. Water on a circuit board is definitely bad. I'm sure you've heard that water and electricity don't mix. Actually, they do mix, and that's the problem. Water is very conduc-

Water can flow into small openings that dust normally can't reach. So, could you ever make your R/C car's electronics waterproof? Theoretically, yes, but not realistically. R/C boats usually have a waterproof radio box that helps keep your electronics dry even if the boat sinks. You could construct a waterproof box for your R/C car's radio equipment. But it would not only

add weight to the car; it would also make the car more complicated because you'd have to work around it. It's far easier to simply be careful and avoid water.

Receivers

There are several ways to make the receiver more dust- and water-resistant. The best method for you will depend on the mounting position of the receiver and on whether you're more concerned about dust or water. If dust is more

of a concern, and if you change your servos quite a bit or if you frequently take your receiver out of the car, use tape to protect the electronics.

Cover the case seams with tape applied to the outside edges of the receiver case. To shield servo plug openings, apply more tape; cut out an opening that's just large enough for the plug to fit through. I recommend that you use either electrical tape or duct tape. If you



To protect your receiver from dust and water, put it inside a balloon, then seal the balloon with a zip-tie.

For extra protection when using the "balloon method," put some silicone RTV sealant or Shoe Goo around the balloon's neck after you've tightened the zip-tie. Don't get sealant on the receiver.



decide to use duct tape, be sure to change it regularly, or it will leave residue on the receiver case.

The other way that I would recommend is a bit more permanent and makes the receiver much more resistant to water and moisture. First, plug in all the servo wires and set up the servo the way you want it to be; then take a balloon, stretch it out a little, and put the receiver inside it. Make sure that the antenna wire, like the servo wires, is pulled all the way out of the

balloon. Next, snug a small zip-tie around the receiver. This will prevent the receiver from moving around inside the balloon. Now snug another small zip-tie around the servo wires and antenna that are sticking out of the balloon. Attach the receiver to the chassis using servo tape, and you've finished.

One variation on this trick is to put a little silicone RTV (available at auto-parts stores) around the balloon opening after you've zip-tied it. If you use silicone on the balloon opening, assuming you don't have a hole in the balloon, you can practically stick the whole receiver under water, although I don't recommend that you try this. At this point, the only dust you have to worry about is whatever might be inside the balloon when you put the silicone on it.

Speed Controls

Speed controls are an entirely different animal. There are two types. Mechanical speed controls are pretty tough to make water-resistant. About the best thing that you can do is put a balloon, e.g., the Tamiya® Rubber Bag, over the top of yours. This will protect it somewhat, but the resistor will still be out in the open, and you can't really put a balloon over that, because it gets hot enough to fry an egg. The resistor isn't a problem where dust is concerned, but water is another matter; current flows through the resistor, remember?

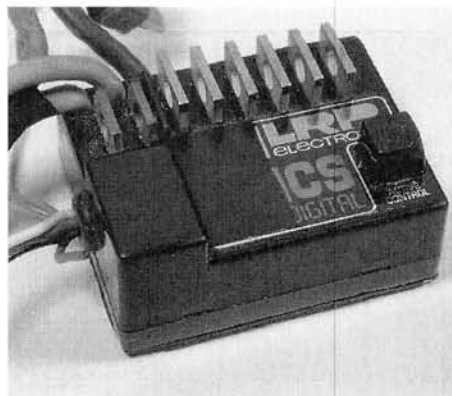
Is it worthwhile to try to protect your mechanical speed controls? Because they aren't very efficient, most people replace them with electronic speed controls. And some people like the fact that mechanical speed controls are pretty inexpensive to replace. So why worry about whether they're "cheap to fix"?

Now, what about electronic speed controls? Modern electronic speed controls are pretty well sealed against dust, so you really shouldn't have to worry about them being damaged by it. This is especially true if you keep your car pretty clean. Your main problem with an ESC is water.

Again, let me remind you that you shouldn't get electronic components wet. If you do, you can damage them. If you get your ESC wet

while it's still under warranty, I can virtually guarantee that the manufacturer will not honor it. So think before you act, and be careful.

To protect your ESC, wrap tape around the outside of the case and cover the case seams (as you did to protect the servo and receiver). If there are any large openings in the ESC case, e.g., where wires exit, put a little silicone RTV over them. Remember that you're just trying to keep out dust and moisture. Your main problem will be the heat-sink area; frankly, I'd just leave that alone, as there's not much you can do here. Just worry about the case halves.



Place a piece of electrical tape over the tops of any pots on top of your ESC. Also wrap a layer of tape around the case seams. Don't try to seal up the FET area because you can fry your ESC by doing so.

The tape and silicone RTV will, for the most part, take care of the dust. To protect against water and moisture, mount the ESC on a part of the chassis that's least likely to be splashed. For example, if your car has a tub chassis, try to mount the ESC low in it. Remember, you're just trying to make the electronics more water-resistant; you don't plan to run your car underwater (if you do, we need to have a little talk!).

If there's really no place on the chassis that's always safe from splashes, seal the ESC case with tape, and then make a small

cover for it out of Lexan scraps. Don't forget to drill a few holes in the cover for air-cooling. Most modern ESCs run pretty cool, as long as you don't run an insanely fast motor. Many have automatic thermal shutdown, so they turn off if they overheat. But you still want some cooling air to circulate over the heat sinks.

MAKE YOUR ELECTRONICS WATERPROOF & DUST-PROOF

Servos

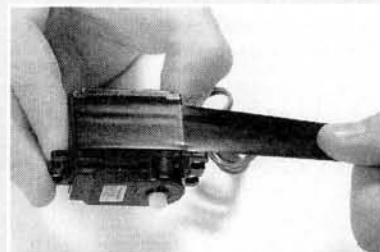
Servos are a different story when it comes to waterproofing and dust-proofing. The servo's output shaft makes it slightly more vulnerable to water and dust contamination. Generally, servos are sealed pretty well, but there's always a chance that yours isn't. Because the servo case is not a one-piece unit, there's a chance that dust and water will get in.

About the best thing you can do with a servo is to put tape around the edges of its case to seal it. But remember: even though the surface may look clean, it probably has oils on it, especially if it has been handled

frequently. And if there's dirt or oil on the surface, many types of tape will just come off. So what do you do?

Clean the surface of the servo case with rubbing alcohol; after that, try not to touch it too much or, the oils from your hands will get onto it. For tape to stick really well, the surface must be clean, dry and oil-free.

Now, which type of tape should you use?



To help seal servos, first use isopropyl alcohol to clean off the surface of the case. Then moisten a cloth with a little alcohol and use it to clean the area where you plan to apply the tape. Finally, wrap a layer of tape around the case seam.

Good electrical tape will work very well. Another good option is duct tape that has been cut into 1/2-inch-wide strips. Again, change the tape regularly to avoid having residue sticking to the servo case, and always clean the case before you apply new tape.

A much better solution would be to simply go out and buy a highend, dustproof, waterproof servo. You'll also get the additional advantages of faster transit time, more torque and smoother operation. But if such servos are beyond your budget, follow my suggestions to protect the ones you have.

WRAPPING THINGS UP

There are probably more things that you can do to keep your electronics safe from dust and water, but these suggestions should cover most situations. Some of these tricks may make accessing your electronics a little more difficult, but the extra protection can make them last quite a bit longer than they

would otherwise. It may take some extra effort, but think of the peace of mind of knowing that your electronics will stay drier and cleaner.

**Addresses are listed alphabetically in the Index of Manufacturers on page 200.*



ON SALE NOW!

At your newstand or hobby shop!



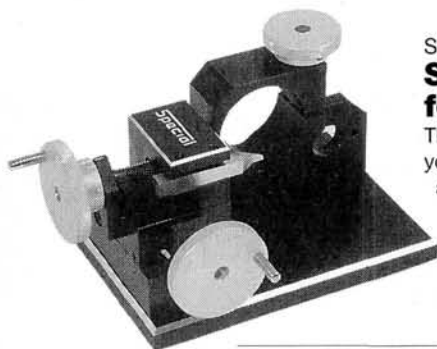
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\$4.95**

Radio Control Touring Cars

Don't miss this special issue from the editors of Radio Control Car Action. It contains everything you need to know about parking-lot racing and includes product guides, step-by-step how-to's and the latest tuning tips.

Or turn to page 196 to order.

WHAT'S new



SERPENT SSP Comm Lathe for Stock Motors

This super-accurate lathe was designed for tune-ups on your stock motors. Simple to set and anodized in gold and black, it includes a carbide cutting bit and has a heavy, wide base plate for better stability. It comes with a strong plastic case.

Part no.—1252; price \$157.95.

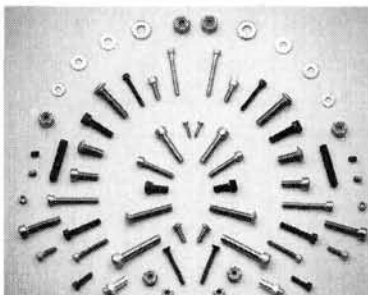
Serpent Inc. U.S.A., West Park Center, 2832 NW 79th Ave., Miami, FL 33122; (305) 639-9665; fax (305) 639-9658.

HYPERFORMANCE PRODUCTS

Black-Alloy and Stainless-Steel Hardware

These black-alloy and stainless-steel nuts and bolts are available in a variety of typical and unusual sizes to meet all your building needs. Many of these are also available in aluminum. For part numbers and price information, contact Hyperformance Products.

Hyperformance Products, P.O. Box 5542, Fullerton, CA 92838-0542; phone or fax (714) 952-3530.



HAMMAD GHUMAN

Alloy Rear A-Arm Mount Set

These heavy-duty A-arm mounts for Team Losi's GTX have a unique, ball-jointed design that allows you to change angles by changing only one of the two mounts. Unlike other designs, which put stress on the mounts even when the car is not moving, this results in zero preload on the mounts. The set comes complete with front and rear mounts, replaceable ball joints and titanium hinge pins.

Part no—GX-2000; price—\$29.95.

Hammad Ghuman, 6 Tower Heights, Albany, NY 12211; (518) 458-8441; fax (518) 458-2712.



NOVAK

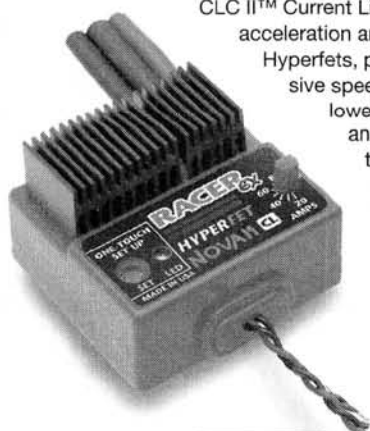
Racer-EX Current Limiting Hyperfet ESC

Novak has combined the best features of the Racer ESC—huge 12-gauge wires for competitive racing, the original CLC II™ Current Limiting Circuitry for smooth and efficient acceleration and Novak's One-Touch Set-Up™—with Hyperfets, previously available only on more expensive speed controls. This Hyperfet ESC offers

lower "on" resistance, higher-rated current and tougher braking power. Safety features include dual-level thermal protection and digital anti-glitch circuitry. Its Solid State RVP™ Radio Priority Circuitry will maintain complete control of your vehicle even if your batteries dump; this eliminates the need for an external receiver battery pack.

Part no—1655; price—\$160.

Novak Electronics, 18910 Teller Ave., Irvine, CA 92715; (714) 833-8873; fax (714) 833-1631.



PRO-LINE

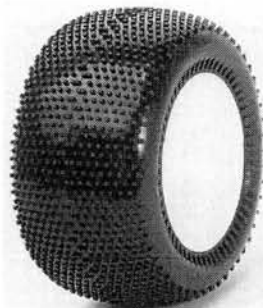
Hole Shot Truck and Buggy Tires

These tires redefine pin performance by combining the small pin and separation design of the mini-pin with the square edges of the Square Fuzzie tire.

Newly designed, reinforced interior and exterior low-profile sidewalls and a redesigned center carcass provide more support than ever. Both the truck (shown here) and car Hole Shots come with oversize, high-density foams and are available in Super-Sticky M2 and Extremely Soft M3 compounds.

Part nos. and prices—8192M2 and 8192M3 (2.2-inch rear truck), \$17.95; 8183M2 and 8183M3 (2.2-inch rear buggy), \$12.50.

Pro-Line, P.O. Box 456, Beaumont, CA 92220; (909) 849-9781; fax (909) 849-2968.



DAHMS RACING BODIES

Spitfire XLSS Supertruck Body

This new, narrow, superspeedway extended-cab supertruck body was designed to fit the Associated RC10LSS, Trinity Evolution SS and other narrow 1/10-scale superspeedway cars. Its aerodynamic features include 3D side panels that can be shaped for superior handling and speed. Details include a racing spoiler, new headlights and taillights and grill decals.

Part nos. and prices—D243 (.030 Lexan), \$19.99; D244 (.040 Lexan), \$20.98.

Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.



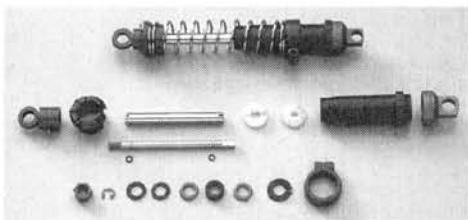
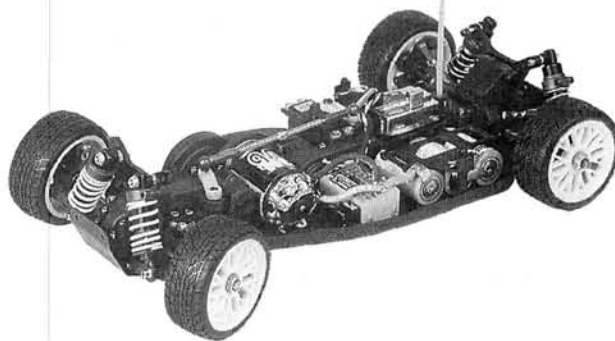
TEAM LOSI

Street Weapon

Based on Losi's famous XX-4, the Street Weapon offers all the proven race-winning components available in other Losi cars, along with innovative technology. This low-maintenance sedan features hard-anodized shocks with dual O-ring cartridges; carbide-equipped ball differentials; soft compound, low-profile racing tires; adjustable body mounts; fully enclosed 3-belt drive system and all the high-quality, leading-edge materials found in other Losi cars and trucks.

Part no.—A-0200.

Team Losi Inc., 13848 Magnolia, Chino, CA 91710; (909) 465-9400; (909) 590-1496.



PROGRESSIVE SUSPENSION

External Damping Control (EDC) Shocks

Widely known for its contributions to the full-scale industry, Progressive Suspension now offers shocks for 1/10-scale cars and trucks. The EDC design allows you to change piston valving externally rather than tearing

the entire shock apart. Simply rotate the adjuster shaft and make your adjustment.

Part nos. available through your local supplier; price—\$59.95.

Progressive Suspension USA, 11129 G. Ave., Hesperia, CA 92345; (619) 948-4012; fax (619) 948-4307.

KYOSHO

Dodge Ram Nitro Truck

Kyosho's latest vehicle features a rugged reverse gear, great maneuverability and Quick Reverse Clutch, which allows the driver to instantly switch into reverse with a 2-channel radio. Its 2mm aluminum chassis comes with 4-wheel independent suspension with oil-filled shocks and a 4WD center-shaft transmission with two gear diffs for smooth and efficient power. The truck also comes with an authentic 1/10-scale Dodge Ram body with decals for creating Viper GTS trim, Tracker™ tires and chrome roll bar and lights for a completely scale look.

Part no.—KYOC0426; price—\$399.99.

Kyosho; distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



AIRTRONICS

Contender Electronic Speed Control

This latest ESC from Airtronics can operate off 6- or 7-cell Ni-Cd packs and stock 05-size ferrite motors. It uses 12 high-power MOSFETs for forward and reverse control, is equipped with an Auto Temperature Cutoff circuit to prevent overheating and possible damage, has a delay circuit between forward and reverse, comes with a large heat sink, operates off a regulated supply of voltage to prevent overheating, and includes an LED so you can set the neutral and high-point trims for maximum performance. It comes with built-in mounting lugs for easy installation. Maximum current doesn't exceed 30 amps in forward or 10 amps in reverse.

Part no.—96351; price—\$99.95.

Airtronics Inc., 15311 Barranca Pky., Irvine, CA 92718; (714) 727-1474; fax (714) 727-1962.



KLOTZ

ModelUBE

This lube—specially designed for R/C engine applications—fights power-robbing heat, and it burns off quickly without sacrificing film strength. Its formula helps to keep plugs clean; this promotes rapid, lag-free throttle response, protects your engine from undue wear and helps provide maximum performance.

Part nos. and prices—

KL-308 (4 oz.), \$1.60;

KL-310 (12 oz.), \$3.95.

Klotz Special Formula Products Inc., P.O. Box 11343; Fort Wayne, IN 46857; (800) 242-0489 (orders only); (219) 749-0489; fax (219) 749-6234.



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R/C DOCTOR

(Continued from page 43)

RECAP, REBRUSH AND RESPRING

After the dirt had been removed from the endbell, I saw that the brushes weren't the only victims of rough, off-road running: two capacitors had been destroyed in some truckish imbroglio, as well. I removed the split caps and replaced them with new, 0.01-microfarad ceramic units that I picked up at Radio Shack for less than a buck. I soldered on a new set of Trinity hard serrated brushes, having first "tipped" the ends of the brush leads with a little rosin flux so the solder flowed smoothly and evenly. If you use needle-nose pliers to grip the brush leads 1/8 inch or so from the end, you can properly position the brushes and solder them without having the solder run up the lead and make it stiff and nasty.

I knew I'd use this motor on fairly smooth asphalt, so

I changed from very heavy brush springs to light-medium. I used a set of Reedy* Copperhead on-road springs because I'd had good luck with them in this application in the past. I did, however, have to nip their rather long lever ends with a side cutter to make them fit into the brush-hood clip. After placing a single drop of Niftec's* Milspec bearing oil on each bearing from the inside, I prepared to reassemble all the major pieces into what I hoped would be a major pavement-scorcher.

WHAT TIME IS IT?

After checking my bench log, I dropped the proper number of washers onto the upper and lower shaft ends and carefully slid the lovely armature back into the motor can. I always do this from left to right instead of from top to bottom because it's too easy for the spacers to fall off the

lower shaft end and stick to the magnets; if this happens, they'll wreak havoc on the motor's interior as soon as you crank it up in battle. Ouch!

Certain that only a few threads from each endbell screw passed into the ring, I pressed the endbell back into the open end of the can and then rotated the bell until the ring was captured under the small nipples that protrude from the can's interior. I carefully moved the bell until my timing marks lined up perfectly and then cinched the screws down tightly. After reassuring myself that the endbell wouldn't move, I inserted the brushes into the hoods and installed the springs. I hooked up the motor to my 4-cell battery pack to double-check the direction of rotation and gave the brushes a minute or so of break-in time on the new comm. There! Now I was ready to find out whether all my

hard work and attention to detail were worth it.

REDOIN' THE DYNO THING

Motor in hand, I moved over to the dyno section of the workbench and cranked up my LAVco Pro Dyno once more. This time, the numbers were much more impressive: some of the strongest dyno readings I've ever seen! (See the accompanying chart for before-and-after comparisons.) Total cost: a set of brushes, springs, caps, a couple of passes on the comm lathe, some motor spray and 40 minutes of my time. The payoff is bound to be a bunch of weekends spent giggling as I pass my modified touring-car buddies on the straights and pound past them in the turns. Who says this hobby can't be fun?

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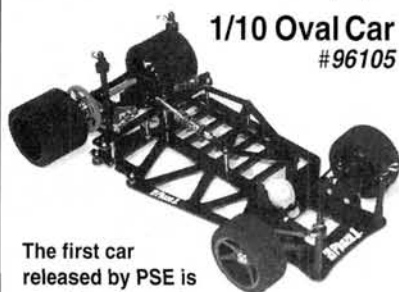


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IFMAR WORLDS WARM-UP

(Continued from page 143)

with 200 points, Mark Francis placed second with 197, and Atsushi Hara came in third with 196.

• **4WD.** The crowd was excited as the 4WD field—six Yokomos, three Losis and one Schumacher—neared the start. Everyone was eager to see not only the battle between Atsushi and Masami, but also whether the newly released XX-4 would steal thunder and score the victory. Regardless of the outcome, it's great to see this kind of interest in the once-forgotten 4WD class here in the U.S. Once the first Main event was under way, one thing was evident: the competition in 4WD Mains would be much hotter. Throughout the entire 5 minutes, the lead changed and the drivers swapped positions in some very close racing. In the end, the top four finished within 3 seconds of one another. Masami took the victory. Atsushi Hara finished second, and Brian Kinwald edged out Matt Francis for third at the finish line.

As the second Main got under way, Atsushi and Masami pulled away from the rest of the field. The two swapped the lead a couple of times; Masami bobbled and Atsushi took the win. In the end, Masami was second and Toshihira Hirai finished a distant third.

Going into the third Main, both Masami and Atsushi had scored a win; and with a third-place finish, Brian Kinwald wasn't yet out of it. It would all be decided in the next 5 minutes. Masami took the holeshot and never looked back. He led the final Main wire-to-wire and, after building a comfortable lead, cruised to victory. Mark Pavidis finished second. Brian and Matt had another sprint to the finish line. This time, Matt edged out Brian and took third.

When the points had been totaled, Masami had won the 4WD class from the TQ position, just as he had in the 2WD class, with 200 points. Atsushi Hara finished second with 199 points. Matt Francis and Brian Kinwald tied for third with 195 points each. Matt had the better third round score, though, and finished third overall, with Brian fourth.

FINAL THOUGHTS

If this race is any indication, the Worlds should be a great week-long competition. The drivers of the Yokomo team from Japan have established themselves as the ones to beat, but I'm sure the rest of the teams will be ready to challenge them when this year's World Championships get under way.

Thanks to the Ranch Pit Shop for hosting such an enjoyable event. All the racers look forward to returning for the World Champs. Congratulations to Masami Hirosaka on his 2WD and 4WD victories. ■

PURE TEN SPIDER FULL OPTION

(Continued from page 72)

While we were at it, we installed Kyosho's stainless-steel brake disk (no. SPW051) for added stopping power.

• **Suspension and steering.** Up front, we installed Kyosho's Front A-arm set (no. SPW054). This set increases the rigidity of the front steering uprights and prevents them from flexing (flexing can cause erratic handling). These arms are a bit tricky to install, so here's a tip we learned: set your car's front camber without the rear link installed, remove the shocks, then set the length of the rear link so that the suspension operates without binding.

Kyosho's Unicrank steering bellcranks (no. 39655) replace the stock kit's servo-saver unit, which is a little sloppy for our tastes. The Unicrank allows you to use the servo-saver of your choice for more precise steering. If you want to go wild, you can install tiny ball bearings (no. 1902) in the bellcranks for the ultimate in precision.

The GP-10's non-adjustable steering and rear camber links are for the birds and should be replaced with Kyosho's Adjustable Rod Set (no. SPW005). You'll also need a set of 5.8mm ball ends (no. LA-43).

• **Carbon-fiber bits.** Although lighter and more rigid than the stock aluminum piece, Kyosho's Special Upper Plate (no.

SPW061) is, in our opinion, strictly for the most serious racers. You probably won't notice much of a difference on the track, but your car will be lighter and less likely to get "tweaked" during a hard crash.

The Special Damper Stays (no. SPW059, front, SPW060, rear) replace the kit's plastic front shock tower and aluminum rear tower with nicely made carbon-fiber plates. The rear plate is identical to the stock piece, but the front plate provides better shock geometry than stock.

COBRA ON THE TRACK

In box-stock form, the Pure Ten Nostalgic cars are fun to drive and handle well. With a few mods, however, the GP-10 chassis really comes to life. The most noticeable differences come from the addition of the tuned pipe and 2-speed transmission. Even the sound of the engine takes on a menacing quality when fed through the tuned pipe—all the better, as it enhances the audibility of the transmission's precise gear changes. You can alter the point at which the tranny shifts by turning an adjustment screw on the unit's clutch.

The oil-filled shocks smooth out bumps much better than the kit's coil-spring "bouncers," although no chassis refinements would make much difference

were it not for good tires, and the Kyosho slicks provided ample traction, even on slightly dusty asphalt. To help control weight shifting during hard cornering, we added the yellow swaybar from Kyosho's Stabilizer Bar Set (no. SPW056-1) to the rear of our GP-10. With the engine and tranny attached to the rear of the chassis, there's a lot of weight that can shift and cause massive chassis lean. The bar helps keep the chassis flat during cornering.

After viewing photos from the Kyosho World Cup finals, where there were often as many as 10 vintage Nostalgic cars attempting to occupy the same line through a corner, we're convinced of the timeless beauty of these famous sports cars—and the admirable job Kyosho has done in their scale reproduction. With the addition of some carefully selected hop-ups, any GP-10 chassis can generate the same type of performance as that of the World Cup-winning cars. You don't need to make all of the mods shown on our test car, but you have to admit, our little nitro Daytona is one sweet ride.

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R/C Men of Action

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I've lost track of the number of times you guys have written or emailed with questions on how to build a track.

What could be so hard? A few curves, a few straightaways, a jump or two, and you're in business. Then there are those who write in whining that they have nowhere to race or that the track is just too far away.

Chris, Inspired by your July '96 issue, my friend (Ryan Baillie) and I decided to build an R/C off-road track (after a few months of laziness). We each sketched about three different layouts and then picked the best one. We soon started work on the track by scavenging the dump (and anywhere else we could look) for the orange flex pipe and the straight pipe. The straight pipe was heavy for only the two of us.

On the first day, we completed the lower half before placing the pipe. After placing the pipes, we had to carry heavy rocks and sandbags and place them one by one to hold the flex pipes in place. On the morning of the second day, we put the finishing touches on the track layout and then plucked the live weeds and shoveled off the dead ones. We returned to the dump for a pipe to be used for a tidal-wave jump and a piece of wood for the base of the second

Well, here are two stand-up guys who did something about their problem instead of wishing someone else would do it for them—two guys who, instead of pouting all Saturday afternoon while watching the idiot box, took action to make their "R/C life" better. They did it alone—just the two of them! My kind of guys. Thanks.



Ryan Baillie



David Nepomuceno



With a little planning, scavenging, lifting and shoveling, David and Ryan created an exciting off-road race circuit for themselves and their friends. It didn't cost a dime—just a few days of effort and team work. The payoff?—an excellent place to race!

jump. We set them in place, and I said to myself, "The landing for the tidal-wave jump sucks!" There was a giant ditch right on the landing that was about a foot deep! Using a shovel, I had it filled in about 30 minutes. I then filled two buckets with water, which I poured over the landing, and I stomped on it to smooth it out. I pretty much had to do that on every place where there was a down-grade. We then completed the jumps, looked at the track and said, "Damn! We did one heck of a good job!"

So that's my story of how Ryan and I built a track close to our homes so that we wouldn't have to drive for an hour or so to SoCal. We are still making adjustments to the track (adding more jumps) to this day.

David Nepomuceno
Vista, CA

This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. My Internet address is: chrisc@airage.com.

Trick Track award

As "Lord of the Lot," I hereby decree that I will award a prize of a one-year **free** subscription to industrious track builders. I will choose, at my discretion of course, a track you've constructed on your own—like the guys did here. So send in the

photos. Oh, and by the way, if schemers (I know who you are) are thinking, "I'll just take a shot of a track in my area and tell Chris I built it. That dummy will never know the difference," they should listen up. Slick, you can forget it! I want construction shots with the builders in the photo. And I'm psycho, I mean psychic, and I'll know if you cheat. Then I'll be forced to tell the world!

